CONFLICT AND COMPLEMENTARITY IN BAMANA FARMING: A CASE STUDY OF SORO, MALI

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ABSTRACT

This thesis analyses the conflict and complementarity of farmers' household labour organisation and land use patterns in a village case study of Bamana farming in Mali. Taking the household as the basic production organising unit, three themes in peasant agriculture are investigated: 1) the types of fields managed and worked by different household members, 2) the agro-ecology of the farming system, and 3) the balance of subsistence and commodity production goals. These human-land relations within a capital-poor peasant farming system are central to the development problems faced by a country with a national economy dominated by peasant agriculture.

Drawing from an intensive study of a village 45 km from Bamako, data on all of the village's household and individual fields were collected to determine the characteristics of the fields and the relationship between the fields and the farming system. A combination of interviewing techniques and regular observations provided most of the raw data, which were supplemented with archival research and secondary source material.

Within the farming system today, household heads have the greatest access to land and labour. For them, non-household production units are complementary only to the extent that they support the reproduction of the household as the first priority in agriculture. The personal fields of household subdivisions, often ignored in the literature on farming systems, compete for labour with the household labour group and therefore add a degree of potential tension to the farming system. The thesis concludes that in the case study village farmers have developed commodity production to complement subsistence production. Subdivisions of household labour groups produce fuelwood and market garden crops during time and in locations that do not directly conflict with household grain production. However, this apparent complementarity within a system of unequal access to land and labour is not without contradictions. These contradictions define some of the constraints on production at the level of intra-household farming relations.

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ABBREVIATIONS & CONVENTIONS

AAIB	Association Agricole Indigène de Baguineda
ANF	Archives Nationales de la France
ANM	Archives Nationales du Mali
AOF	Afrique Occidentale Française
AS	Annuaire Statistique
ASECNA	Agence pour la Securité de la Navigation Aérienne en Afrique et à Madagascar
CFA	Communauté Financière Africaine
CFAR	Centre des Femmes Animatrices Rurales
CFDT	Compagnie Française pour le Développement des Fibres Textiles
CMDT	Compagnie Malienne pour le Développement des Fibres Textiles
DNAC	Direction Nationale des Arts et de la Culture
DNAFLA	Direction Nationale de l'Alphabétisation Fonctionnelle et Linguistique Appliquée
EEC	European Economic Community
GDP	Gross Domestic Product
GNP	Gross National Product
IER	Institut d'Economie Rurale
IGN	Institut Géographique National
ISH	Institut des Sciences Humaines
ILCA	International Livestock Commission for Africa
ITD	Inter-Tropical Discontinuity
OACV	Opération Arachide et Cultures Vivrières
ODR	Opération de Développement Rural
OECD	Organisation for Economic Co-Operation and Development
OHV	Opération Haute Vallée
OPAM	Office des Produits Agricoles du Mali
ORM	Opération Riz--Mopti
ORS	Opération Riz--Ségou
ORSTOM	Office de la Recherche Scientifique et Technique Outre-Mer
PSP	Parti Progressiste Soudanais
SOAS	School of Oriental and African Studies
SOCAM	Société des Conserves Alimentaires du Mali
SOCOMA	Société des Conserveries du Mali
UDPM	Union Démocratique du Peuple Malien
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
USRDA	Union Soudanaise Rassemblement Démocratique Africain

Currency. Since 1 September 1984, Mali has used the CFA franc which is also used in 13 other African countries. During 1987, the exchange rate was £1 = approx. 425FCFA, or $1 = approx. 300FCFA.

Weights and Measures.

1 millimetre (mm)	0.039 inch
1 centimetre (cm)	10 mm; 0.394 inch
1 metre (m)	100 cm; 1.094 yards
1 kilometre (km)	1,000 m; 0.6214 mile
stere	1 cubic metre; 1.308 cubic yards
gram (g)	0.0353 ounces
kilogram (kg)	1,000 g; 2.205 pounds
tonne (t)	1,000 kg; 0.984 long ton

A Note on the Maps.

The maps were 'drawn' using a combination of several instruments and sources. The base for the national and regional level maps was the Institut National Géographique (IGN) République du Mali 1:2,500,000. Laurie Yokoyama Becker digitised the boundaries and edited the maps using Arc/Info geographic information systems (GIS) software. From the main frame computer where the base map files were completed, she down-loaded them to a 90 mm micro-computer floppydisk so that I could edit them using MacDraw II graphics software.

For the Soro and Environs maps, Laurie and I followed the same procedures, but used the IGN Bamako-Est 1:200,000 topographical map as a base. The village level maps are based on cartographic information that Laurie digitised from aerial photographs taken in 1957 and 1974 (1:50,000), enlarged to scales of 1:12,000 and 1:19,000 respectively. I then edited this base using data we collected on the ground to produce the maps included in the text. A complete list of the sources is included in the bibliography.

Bamana Alphabet and Spelling Convention.

	English sound	Bamana example
a	father	*kaba* 'maize'
b	bat	*balo* 'food'
d	dog	*daba* 'hoe'
j	jar	*jaba* 'onion'
e	fate	*jele* 'axe'
è	get	*sènè kè* 'do farming'
f	field	*foro* 'field'
g	go	*ga* 'kitchen'
h	have	*hèrè* 'peace'
i	sheet	*misi* 'cow'
k	court	*kungo* 'bush'
l	late	*fula* 'Fulani'
m	malo	*malo* 'rice'
n	nine	*nakò* 'garden'
ny	annual	*nyò* 'millet'
ŋ	ring	*ŋunu* 'hive'
o	potato	*bolo* 'arm'
ò	sought	*mògò* 'person'
p	play	*palan* 'bucket'
r		*taara* 'go'
s	sister	*saga* 'sheep'
sh	sharp	*shyò* 'cowpea'
t	tart	*tiga* 'groundnut'
c	China	*cèn* 'sand'
u	flute	*kulu* 'hill'
w	west	*wulu* 'dog'
y	you	*yòrò* 'place'
z	zebra	*nzèrè* 'watermelon'

Nasalisations

The Bamana language is rich in local variations and multiple pronunciations of the same word. A case that influences the spellings in this thesis is the nasal *'n'* sound before certain consonants. This sound is used by some speakers and not by others, e.g. *nsira* or *sira* for baobab, or Nkòni or Kòni for the village south of Soro. I have tried to use the spelling that most accurately depicts what I frequently heard spoken in Soro.

Place names

I have standardised the spelling of place names in accordance with the Bamana alphabet listed above, and as in (Ba 1987). In some cases altnernative French and Bamana (or other Malian language) phonetic spellings are used in the literature on Mali. To simplify matters, I will use the spelling in the left-hand column. On the right, I have listed other known spellings of the same place. While the official Bamana does not have capital letters, I have used them with place names and family names to help the English reader.

Bamana	Other
Baginda	Baguineda, Baginéda
Buguni	Bougouni
Falajè	Faladié
Jene	Djenné, Dienné, Jenne
Joliba	Niger River
Kanògòla	Kamorola
Kasela	Kaselabougou
Kayi	Kayes
Kulukòrò	Koulikoro
Mèkètan, Mègètan	Meguétana, Meguétan
Mòti	Mopti
Muntugula	Mountougoula
Munzun	Mounsou, Mounzou
Segu	Ségou
Sikaso	Sikasso
Sinsani	Sansanding
Sunuguba	Sounougoubou
Tonbuktu	Timbuktu, Tombouctou, Tonbouctou, Tumutu, Tunbutu
Wèlèsèbugu	Ouélésségougou

GLOSSARY

of Bamana words used most frequently in the text.
Other words can be found in the appendices on crops, etc.

ba	mother
baaraden	worker
bagan	animal, livestock
balo	food
bamanan	Bamana, Bambara: the people, culture
bamanankan	Bamana, Bambara: the language
bolèn	seeding stick
bon	room
bòrò, bòrè	bag; 100 kg sack
-bugu	suffix: town, settlement
buguda	hamlet, satellite settlement
buluku	ploughing
cè	man
cèkòròba	elder man
cibò	see *tòn*
daba	hoe
danni kè	sowing, seeding
dògò	wood (also *lògò*)
dògò siri	bundle of wood; unit of firewood for sale
du	compound, household, farm, house, extended family (also *lu*)
dugu	land, soil; town, village, settlement
dugudasiri	home of protecting spirits of village
dugukolo	land, soil
dugutigi	head of village, village chief
dugitigisigi	installation of head of village

fa	father; patriarch
farafin	dark-skinned, African, black
farajè	light-skinned, European, white
fèrè	public place, village square, courtyard
fobonda	season before the cold season, October-November
foro	field
forobaforo	household field, compound field
fonènè	cold season, December - mid-March
fula	Fulani, Peul (people, culture)
fulakan	Pular (language of the Fulani)
fura	leaf, medicine, poison
ga	kitchen, hearth, household
ga	trestle, awning (for shade or sitting in public)
hòròn	free person
gatigi	head of household, head of compound
jamu	family name, surname; clan, lineage
jatigi	host, landlord
jele	axe
jesa	fence, enclosure
jinè	spirit
jòn	slave, individual
jònforo	personal field
kafo	regional political territory
koro	seeding cup
kò	stream (often seasonal), streambed
kòmò	a Bamana initiation society; fetish of..
kòmòtu	sacred grove of the *kòmò* society
kuma	stake
kungo	uncultivated land, bush, forest, wild land
maci	tractor
manyan	fallow (field)
maraka	Soninké, Sarakolé (people, culture)
misibò	manure
misidaba	oxen-drawn plough
mori	Qur'anic teacher
muso	woman
musodaba	wide-bladed hoe for mounding
musokòròba	elder woman
na	sauce
nafa	something useful, wealth, gain
nakò	garden
nasòngò	sauce expense
ntugun	mound
ntugun wuli	making mounds, mounding
ntura kè	ploughing
nyaman	organic waste, kitchen scraps, courtyard sweepings, used as fertiliser
nyarinyari	harrow
nyò	grain; millet, sorghum
pili mugu	battery powder, used as pesticide (from French, *pile* 'battery')
plan	plant bed (from French, *planche* 'bed')
samiya	wet season, rainy season

samoritilela	Samorian era (c. 1870s - 1890s)
segi	basket
shyèni kè	weeding, hoeing, scraping
siya	ethnicity
so	house
sununkun	see *nyaman*
-tigi	suffix: head of; hence *dugutigi, gatigi, tòntigi*
tilema	dry season, hot season
to	porridge
tòn	labour group, youth farm labour group, age set, young people's association of the initiated
tònci	see *tòn*
tònden	group member
tònjòn	professional soldier of Segu state
tu	grove, wood
-w	suffix denoting plural
wotoro	cart
yiriwali	development

French

arrondissement	county; administrative area composed of towns and villages
bâché	covered truck, e.g. pick-up truck used for carrying people or goods
bas-fond	lowland
caisse	crate
canton	subdivision
cercle	circle; administrative area larger than *arrondissement* and smaller than *région*
commandant	head of *cercle*; colloq. head of *arrondissement*
contra-saison	dry season
labourer	to plough
marigot	intermittent stream, lowland subject to flooding
planche	plant bed
région	region; administrative area larger than *cercle*
travaux forcés	forced labour
villageois	village (adjective form)

Translations: Most of the primary source material for this thesis was collected in Bamana or French, and much of the secondary material was in French. Wherever I have quoted historical documents, as in Chapter IV, I have translated the original French into English. All of the material collected from farmers in Soro was collected in Bamana. Where I refer to a farmer's particular statement or explanation, I have translated from Bamana into English.

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Chapter I.

Introduction to Malian Agriculture, Concepts of the Household and Inequality, and the Research Questions.

This is a case study of farming in Mali, West Africa. It is about how farmers organise themselves and use the natural resources of their land to produce crops. The process of labour organisation, it will be argued, influences both the spatial pattern of land use and the role of human agency in the changing agro-ecology of an area. In this thesis, I will investigate the relationship between field types, agro-ecology, and the production of crops and non-cultivated products extracted from the bush.

These dimensions of agriculture are at the heart of the rural development, agricultural, and food deficit problems facing many African countries today. In the last decade, food shortages, fiscal crises, and mounting foreign debts in some African countries have focused attention on the role of agriculture in African development. That role is especially important in countries such as Mali where agricultural production plays a prominent role in the national economy.

In Mali, a major factor affecting national development since independence in 1960 has been the ability of Malian farmers to feed the nation. Food production has not kept pace with population growth (Lecaillon and Morrisson 1986). Until the mid-1960s, Mali produced enough grain to satisfy its domestic needs, and exported millet and rice to neighbouring West African countries. It was the only net grain exporting country in the region at the time of independence

(Marchés Trop. 1980). Since the devastating drought of the early seventies, Mali has been a net importer of grain (FAO Trade Yearbook).

In Mali, as in some other African countries, food production and distribution have been neglected while development policies have favoured promoting commodities to sell in the world market to re-pay debts. Such commodity orientation has led to increasing conflict between the objectives of state leaders and the objectives of primarily subsistence farmers. Attempts to resolve these problems have highlighted the role of the producers (farmers) and their production constraints.

In particular, a farming systems approach, such as I have taken in this study, considers the farm level view of the organisation of production as the most appropriate for a better understanding of the constraints on production. Farming systems research has been especially valuable in drawing attention to the role of households in production (Moock 1986).

I have used the common analytical themes of conflict and complementarity to compare farmers' strategies of household labour organisation and land use. Within this context, the study is concerned with influences on the reproduction of the Bamana[1] farming system that are internal to the system itself. The complementarity of relations within and be-

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1. Bamana is an alternative spelling for Bambara. The Bamana are part of the broader Manding culture which includes the Malinke and Dyula among others. Bamana is the main ethno-linguistic group in Mali.

tween households, for example, contrasts with the conflict posited between young and old, and men and women (Meillassoux 1981). Central to this study is the conflict in access to agricultural labour and land resources within and between farming groups. Within the farming system, who has access to land and labour? What are their constraints on production?

External constraints involving the state-peasantry relationship also affect the farming systems. National development policy and institutions influence the organisation of production and land use patterns at the household level. The relative complementing or conflicting nature of the state-peasantry relationship adds further production constraints from the farmers' perspective. In the light of the attention given to cash crops by development agencies, questions arise regarding whether the objectives of a commodity-oriented state have increased conflict over access to land and labour at the household and village levels.

The changing nature of the farming system is assumed in these questions. To analyse contemporary change, I have concentrated on the role of Bamana farmers as human agents of social and environmental change. Farmers are making and re-making the way they farm and thus their relationship with land and natural resources. To paraphrase Anthony Giddens' (1984:363) paraphrasing of Marx: farmers make their own geography.

The issues of changing land use and household labour organisation with which this research is concerned are in

the long tradition of geographic work on the human - environment relationship (e.g. Grossman 1984; Brookfield 1980; Sauer 1963, 1956; Vidal de la Blache 1926; Barrows 1923).[2] I will use a case study of a farming system to show how and why farmers in a particular place at a particular time are making their own farming system to meet their own objectives. My approach is summed up by a recent description of cultural ecology in studies of agricultural change:

> The focus...is on the dynamics of farming behavior in place. But place contains a myriad of mediating influences on the demand-agriculture relationship[3] and the manner in which it can be altered. In concert, demand themes provide rudiments...for explaining why intensities of agriculture occur where they do and analyzing how they change in time and place. (Turner 1989:93-94)

The research is based on seven months of fieldwork during 1987 in two case study villages in the Kulukòrò[4] Region, two months bibliographic work in Bamako, and two and a half years reading and writing in London at the School of Oriental and African Studies. Most of the fieldwork took place in the village of Soro, (12°30 N 7°43 W), Arrondissement of Baginda, Cercle of Kati. Soro is 45 km SE of Bamako, and 8 km south of the paved Bamako-Segu national route (Map 1.1).

To provide some background to constraints on agricul-

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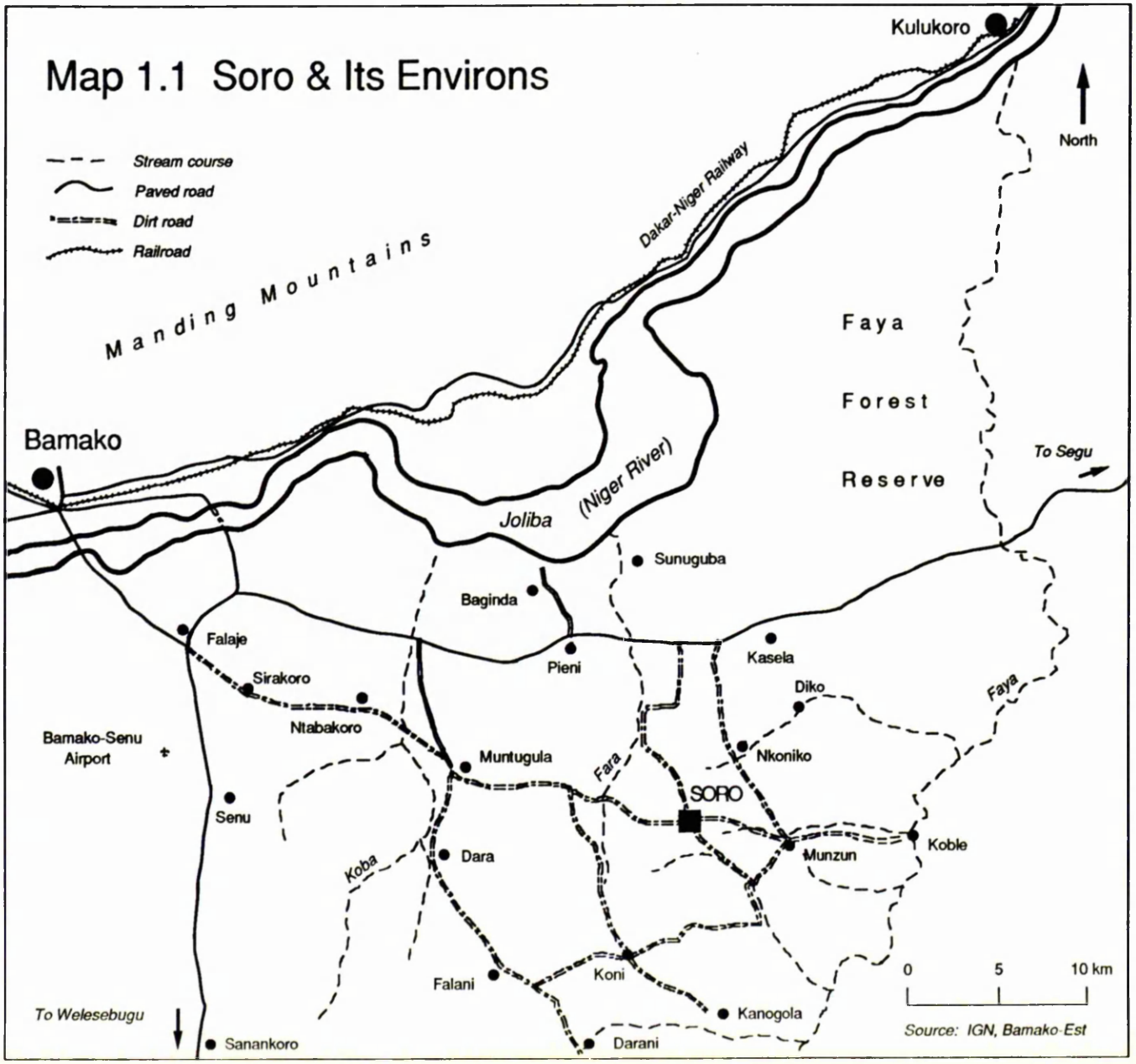
2. See Chisholm (1975:172) and Glacken (1967) on the history of geographic approaches to this relationship.

3. Turner is explaining agricultural growth or decline as responses to changing demands on the production system.

4. This spelling conforms to the Bamana system rather than the French (Koulikoro). For an explanation of the spelling system, see the glossary.


Map 1.1 Soro & Its Environs
Stream course
Paved road
Dirt road
Railroad
Kulukoro
North
Dakar-Niger Railway
Manding Mountains
Faya
Forest
Reserve
Bamako
Joliba (Niger River)
To Segu
Sunuguba
Baginda
Falaje
Pieni
Kasela
Sirakoro
Diko
Faya
Ntabakoro
Bamako-Senu Airport
Muntugula
Fara
Nkoniko
SORO
Senu
Koba
Dara
Munzun
Koble
Falani
Koni
Kanogola
Darani
Sanankoro
To Welesebugu
0
5
10 km
Source: IGN, Bamako-Est

tural production at the national level, I begin with an overview of the geography of Mali. With this background to contemporary Mali as it relates to agriculture, I then turn in the second section, to the origins of social science concepts of peasant production organisation in West Africa. I will briefly review the definition and conceptualisation of the institutions of 'family', 'farm', and 'household', beginning with early (1900-1950s) references to Bamana household structure. I will then broaden the context for the study of the household to include the influence of work in other parts of West Africa.

I have already suggested that different levels of constraints (state, class, village, household, individual) may influence the way agriculture develops. However, I have not mentioned the development of inequality within villages and households. In the third section, therefore, I discuss the concept of moral economy with regard to intra-village inequality. The complementarity of production relations emphasised within the moral economy will be contrasted with the conflict following the development of commodity production and monetary relations. In the fourth section, with a general background to Malian agriculture as well as concepts of the household and the moral economy as a base, I will elaborate on the research questions investigated in this thesis.

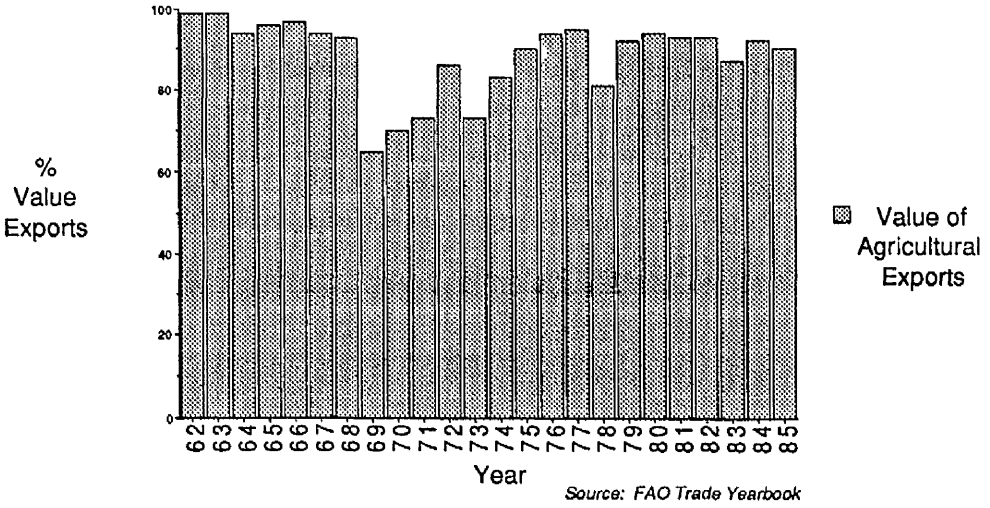
1. National Level Constraints on Agricultural Production.

Figures from government statistics (Ann. Stat.), the World Bank (1988), the FAO (1988) and OECD (Lecaillon and Morrisson 1986) show the dominant role of agriculture in the national economy of Mali. About 80% of the population lives in rural areas, of which 90% is engaged in agricultural, herding, or fishing work. 50% of the GDP is derived from agriculture. Figure 1.1 shows the major contribution of agriculture to overall exports. During the 24 year period 1962-85, the value of agricultural exports was over 90% of the value of all Malian exports in 16 years. There is no question that agriculture plays a major role in the geography of Mali.

Despite the prominent role of agriculture in the national economy and the daily life of many people, production does not support a thriving economy. Only a small proportion of the agricultural sector is commercialised. Subsistence is a major part of the agricultural production. The GDP was only $1,650 million in 1986. With the GNP per capita at $180, Mali is among the ten countries with the lowest GNP per capita in the world. Food shortages in recent years have not been uncommon.

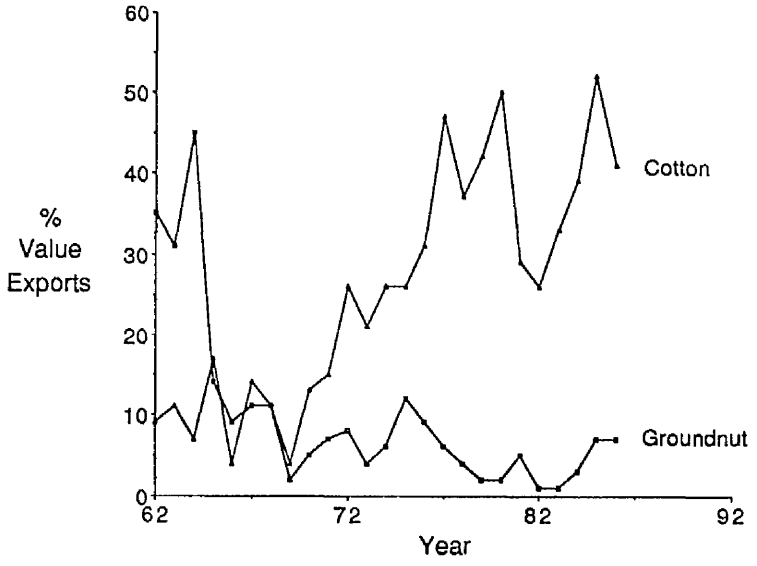
One of the many aspects of the weak national economy is the lack of adequate transportation which severely restricts supply and distribution. Only 1,800 kms of paved roads exist; the national airline, Air Mali, is hampered by management problems; the railroad linking Bamako with Dakar only covers a narrow corridor of the country as does the

Fig. 1.1 Agricultural Exports as a Percent of Total Exports



Source: FAO Trade Yearbook

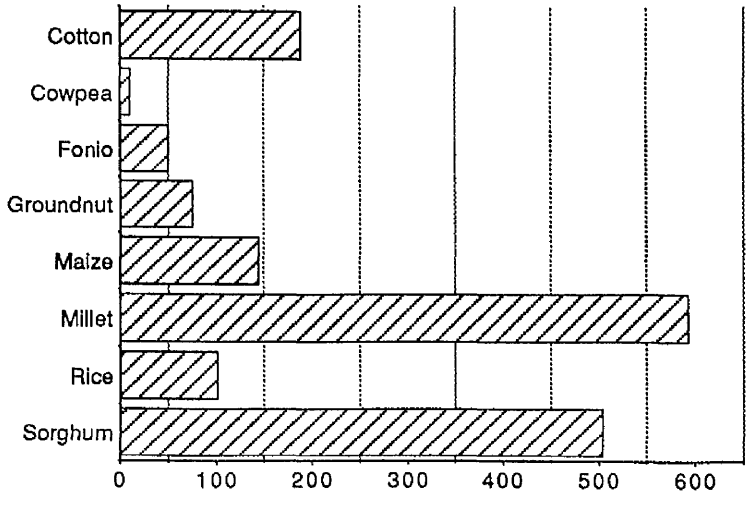
Fig. 1.2 Cotton & Groundnut Exports as a Percent of Total Exports



Source: FAO Trade Yearbook

Fig. 1.3 National Annual Crop Production

Selected Major Crops (1000 tonnes)



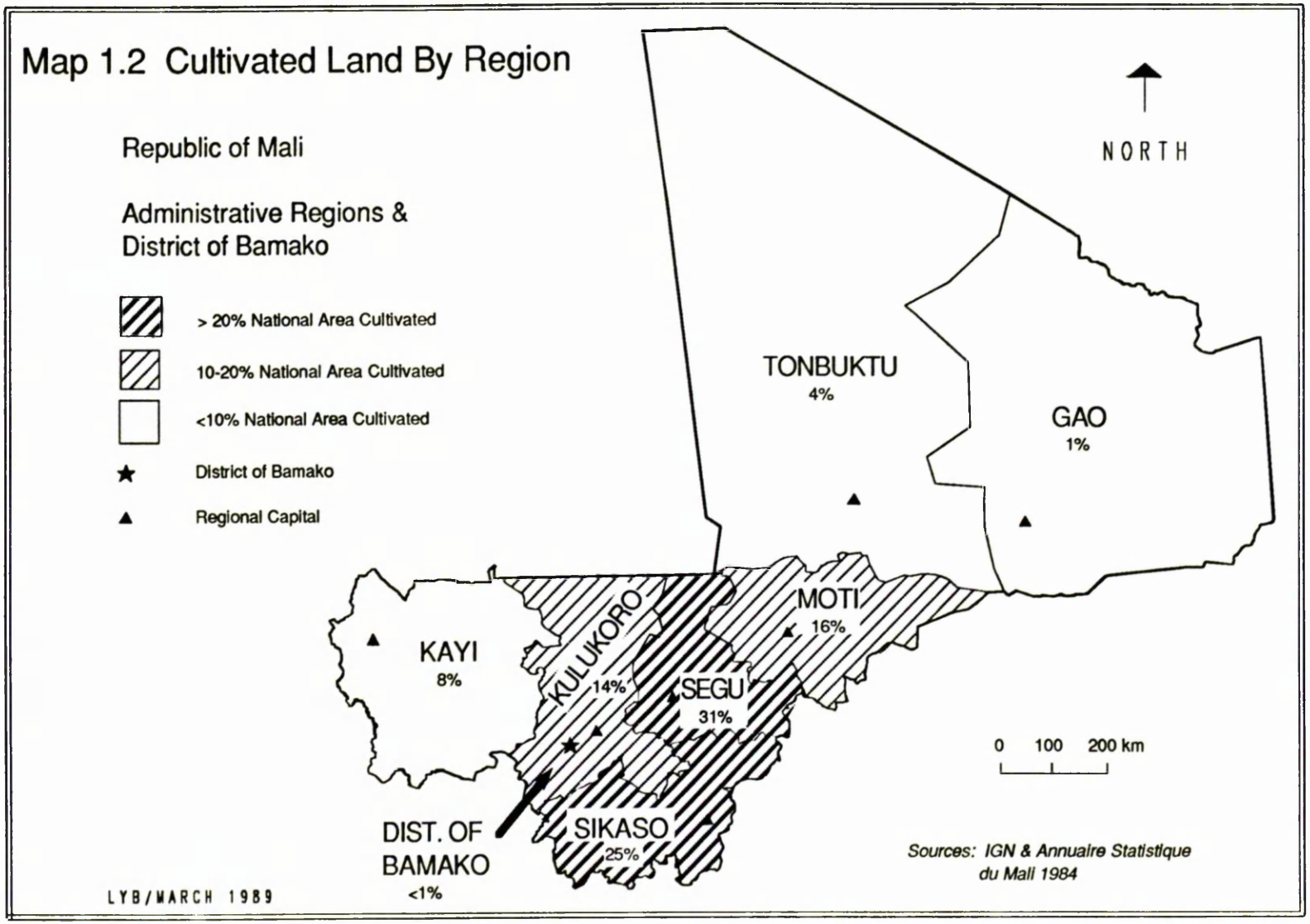
Source: Annuaire Statistique du Mali 1984

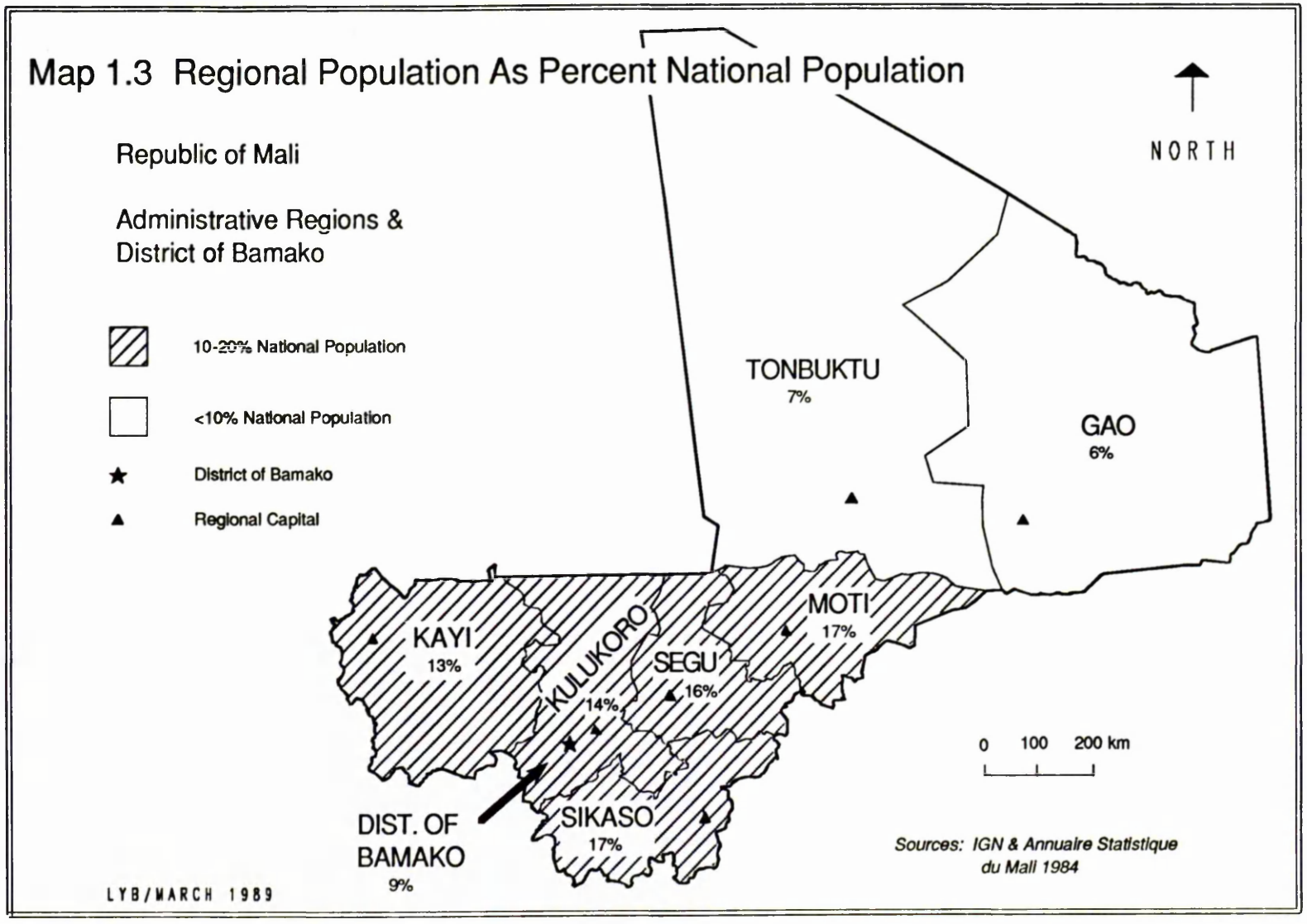
river transportation system.

Of the 1,240,000 km² total area, over five times the area of the United Kingdom or two and a quarter times the area of France, only a fraction of it is arable land. Mali is the seventh largest African country in area, but less than 2% of the total area is cultivated. As Map 1.2 shows, the cultivated land is concentrated in the regions of the south benefiting from higher mean annual rainfall and proximity to the Niger River (Joliba). Over half of the national farmland is in the regions of Segu and Sikaso. Population density is also highest in these areas.

In 1976, 6.4 million people were counted in the national census. The World Bank estimates current population at 8 million. At the current growth rate of about 2.5%, population would reach 11-12 million by A.D. 2000. Current density averages only six per km². The government counted 9,615 villages in 1978. Most people live in the arable sector, though, where population density is closer to 375 per km². 47% of the population lives in the regions of Kulukòrò, Sikaso, and Segu (excluding the District of Bamako) which make up less than 20% of the total area (Map 1.3).

Agriculture is also susceptible to environmental changes. Although estimates are as high as 500,000 ha for the potential flood irrigated land, most production depends on rainfall. Production is thus concentrated in the south where annual precipitation is highest and the rainy season the longest. Farmers have few technological means to buffer their crops from low rainfall periods or locust infest-


Map 1.2 Cultivated Land By Region
Republic of Mali
Administrative Regions &
District of Bamako
> 20% National Area Cultivated
10-20% National Area Cultivated
<10% National Area Cultivated
District of Bamako
Regional Capital
NORTH
TONBUKTU
4%
GAO
1%
MOTI
16%
KULUKORO
14%
SEGU
31%
KAYI
8%
DIST. OF
BAMAKO
<1%
SIKASO
25%
0 100 200 km
Sources: IGN & Annuaire Statistique
du Mali 1984
LYB/MARCH 1989


Map 1.3 Regional Population As Percent National Population
Republic of Mali
Administrative Regions &
District of Bamako
10-20% National Population
<10% National Population
District of Bamako
Regional Capital
NORTH
TONBUKTU
7%
GAO
6%
KAYI
13%
KULUKORO
14%
SEGU
16%
MOTI
17%
SIKASO
17%
DIST. OF
BAMAKO
9%
0 100 200 km
Sources: IGN & Annuaire Statistique
du Mali 1984
LYB/MARCH 1989

ations. For this reason, the region of greatest agricultural production corresponds with arable land (the significant factor being rainfall) and labour (population density).

In analysing this agricultural geography, Malian leaders since independence in 1960 have aimed the bulk of their efforts at the southern sector and the irrigated region along the river. This state investment has led to the concentration of paved roads in the south. The paved roads link production centres with industries which process and redistribute the goods. Cotton has been the focus of attention and is Mali's most valuable export. Since the colonial era, its proportion of the export sector has steadily increased while that of groundnuts, the chief colonial cash crop, has declined (Fig. 1.2). In 1986, the value of cotton exports reached an estimated 52% of total exports. Malian cotton supplies a textile manufacturing plant in Segu, contributing to the development of a secondary industry. Other major commercialised crops include groundnuts and rice. Mango, chili pepper, and tomato production are growing in the Bamako area.

The character of Malian agriculture, however, is not set by cotton and the other commercialised crops, since less than half of total production enters the markets where statistics are kept. Mali is a major dryland grain producer. Millet and sorghum dominate production figures, followed by cotton, maize, rice, and groundnut (Fig. 1.3).

The state wanted to promote grain commercialisation to

stimulate production. After independence, an elaborate rural development structure was established to encourage production as well as to improve living conditions through rural health care, education, and local democratic institutions. The private sale of grain was banned to eliminate the role of private traders who controlled the grain markets but who were perceived as not contributing to the state development ideals. A state grain marketing monopoly, Office des Produits Agricoles du Mali (OPAM), was established. As grain production lagged and the drought took a heavy toll in lives in the post-independence years and the GNP per capita gap between Mali and the world industrial powers widened, Mali grew more desperate for money.

Under pressure from the International Monetary Fund and other lending sources and increasing frustration from inside, the OPAM's monopoly was eliminated. Private trade in grains became legal in 1981. These changes represented a continuation of policies to liberalise the economy begun in 1968 with the coming to power of the current government. Today, private investment continues to grow as the state industries are sold in an attempt to stimulate the economy.

In sum, most agricultural production (dryland grains) depends on rainfall, and is therefore closely linked to favourable climatic conditions. The irrigated and river-flooded rice as well as the concentration of development investment in the wetter south suggests a realisation of the value of water for sustained yields over the years, but neglects the great dryland production zones. The dispersal

over a vast country of peasant farmers growing crops for household consumption and for sale suggests that the lack of an all-season transportation network is a major constraint. Even if the reforms to liberalise the economy might benefit producers, farmers have poor access to markets.

The state-peasantry relations will be the subject of Ch. IV, and in this chapter I will consider other factors in national level constraints on agriculture. This section has given an overview of some of the major characteristics of Malian agriculture. In the next two sections, I will discuss concepts applicable to this farmer-oriented and household-level study.

2. Defining the Household.

In the overview of constraints on production at the national level in the last section, I emphasised that dryland grain production weakly integrated with markets is a characteristic of Malian agriculture. The dominant organising unit for much of that production is the household. To begin the analysis of the changing conflict-complementarity balance within the Bamana farming system, the organisation of farming itself must be defined. I will thus start by examining the central role played by the household in organising labour, determining access to land, and ultimately in production. What is a 'household', and has it remained the same through time? A brief review of early ideas on the elements of Bamana households will introduce concepts of farming organisation that will be used throughout the the-

sis. I will then examine how some of the early concepts of the 'household' in West Africa were too rigid by assuming an institution similar to the Western notion of 'farm'.

i. Identifying Bamana Household Structure: 1900-1955.

In the first half of the twentieth century, the first French studies of Bamana social structure emphasised the central role of a patriarch. Farm organisation centred on the *fa* 'father' who, in principle, had absolute power over household members, controlling people and goods (Aubert 1939). He could rent, pawn, or sell them, and have them killed. He was not an autocrat, though, consulting with family members and other elders before making decisions which would influence others (Labouret 1934: 56). Although the *fa* had ultimate power over the domestic group, he was responsible for supporting his household members.

Who were the household members? They included the patriarch, his wives, their children, his younger brothers, their wives and children, and other persons related through marriage or lineage. Significantly, they also included persons attached to the lineage as slaves. The use of slave labour in farming was one of the major characteristics of production in the upper Niger River basin prior to abolition in 1905. In 1894, slaves accounted for approximately 53% of the population around Segu (Roberts 1987:119).

Like the late nineteenth century organisation of farming in Hausaland (Watts 1983; Hill 1972; Smith 1955), slaves

were integrated into the domestic group.[5] In their early twentieth century sketches of Bamana farming organisation, Maurice Delafosse (1911) and Charles Monteil (1924) mentioned slaves in the division of labour and as having had their own farms. They outlined the model organisation of Bamana farm labour: that all community members[6] and slaves had to work for their community [household] from dawn until around noon, except for two days during which persons could work their own farms (Monteil 1924:188; Delafosse 1911:22).

A clear pattern of a social hierarchy emerges from the early works. At the top, the elder male household heads, especially those controlling large households, had the most power, but they also had responsibilities to fulfil with regard to their dependents. Certain rights and obligations determined the role of these patriarchs. For example, they paid the marriage expenses when their sons married. Wives, as well as sons, younger brothers, and their dependents were obliged to defer to the senior head of household. Monteil also mentioned conflict between youth and elders, the latter amassing wealth at the expense of the former, and women as occupying an inferior position (1924:183,186).

Labouret's (1934) work near Kolokani north of Bamako made more detailed references to the *fa*'s role in agricultural production and introduced the factor of agrarian

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5. For more on slaves in farm labour, see Roberts 1987, Lovejoy 1981, and Miers and Kopytoff 1977.

6. Recognising that African family structure was different from that of Europeans, Monteil preferred to use *communautaire* instead of family (1924:158).

change. The *fa* decided what fields would be worked or fallowed. He had authority over which household members would have access to land and presided over the distribution of grain produced in the household field. Labouret noted the significance of different field types in the complex household farm structure. For the two days during the farming season week when household members did not work in the household field, they also did not eat grain from the reserve of household field grain. To cover their dietary needs for these days, the *fa* approved the cultivation of individual fields by women and children within his household. It is not surprising, then, that the individual field crops Labouret (Ibid:62) observed--millet, maize, rice, groundnuts, cowpeas--were aimed at both feeding the members of a sub-household group during the two days of the week, and also at producing an exchangeable commodity with which to purchase tools and other goods.[7]

The strongest evidence of a changing context for household farming earlier in this century is a reference to the need for seasonal labour migration to earn cash and the tendency for household members, when they earned cash, to seek independence from the *fa*. Labouret (Ibid:63) attributed the cause of this change to the economic conditions of the colony and dates the beginning to the time of one generation

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7. Labouret (Op. cit:62) said that individual goods were called *dunduguma* as opposed to those of the common household called *furu-ba-nafolo*. The latter is most certainly a version of *foroba nafolo foroba* 'household' (see glossary) and *nafolo* 'wealth'.

back, which would have been about 1910-1920. Noting radical change in farming where tractors, mono-cropping practices, and scientific research had been introduced, Viviana Pâques (1954:77-8) added that the phenomenon of the 'breaking-up' of the large family was changing Bamana farming organisation. This process, she suggested, was linked to a growing individualisation of production caused by those seeking to escape the control of the head of the household farm and to the increasing number of young who travelled far to work as agricultural labourers.

Although I will return to the structure of households and their subdivisions in Chapters III and V, I have noted the early emphasis on the patriarch in Bamana farming to point to the character of the 'complementary' production activities of household members. All members of the household had rights and obligations related to production and reproduction. The patriarch had rights to the labour of subordinates, including younger men, women, and non-lineage workers such as slaves. The complementarity of household relations was thus marked by an inequality of access to land and labour, which was tempered by the rights and obligations of individuals. In conflict with the patriarch-dominated system, individuals within the household turned to the new cash economy by 1) growing crops with a market value, and 2) migrating off the farm to earn cash as wage labour.

Inequality, monetisation, and the development of commodity production will be discussed later in connection with changes in the moral economy. In this next section, I will

show that issues related to domestic group subdivisions affect agricultural production throughout West Africa. Defining the organisation of household labour and understanding how that labour has adapted to changing circumstances outside its control are basic to understanding the constraints on agricultural production.

ii. Employing concepts of the household in West Africa.

As I have mentioned, during the colonial period in Malian history[8], a trend toward the breaking-up of farms, especially kin-based production units, was noted with reference to Manding farming communities in the 1930s: '...united and strong at the beginning of our occupation, the pacified community is everywhere in the process of decomposition.' (Labouret 1934:63) A general trend toward the splitting of large production units into smaller ones continues to be noted as a major feature in contemporary agricultural change throughout Africa (Billaz and Diawara 1981), including Mali (Gakou 1987:50-1, Jones 1976:286). Little data on changes over decades in average household size are reliable, but a review of the annual Malian agricultural reports suggests a trend toward smaller units.[9]

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8. During the colonial period, the areas included in the contemporary territory of the Republic of Mali changed names, and the size and shape of the territory changed several times. To generalise, the French occupation began in the late nineteenth century and ended in 1960. It was called, for some of the time, Soudan Français (French Sudan), part of French West Africa.

9. But even here, the data collection methods may not reveal the whole picture (Dembélé 1987; Jones 1976:327).

This trend affects agricultural production by changing the relationships between producers and their access to land and labour. New production constraints and new opportunities have developed as the context of farming has changed at different levels and in different places. Is it possible to refer to the 'complementing' components of a farming system in which a heterogeneous mix of farmers have different access to land, labour, and capital and therefore different production interests? The organisation and control of labour is the point of departure for analysing agricultural production. In the West African region, considerable research on households has led to a re-thinking of the concept.

a. Defining the household in West Africa.

One of the difficulties with conceptualising the problem of the dissolution of the large farm in West Africa is that the 'household farm' itself is assumed to be a fixed, and generally cross-culturally interchangeable entity. This view has hidden the variety of ways through which people organise themselves to carry out their productive, reproductive, and consumptive activities to secure basic life-supporting needs (Netting et al. 1984:xx). In West Africa, the role of households in organising labour and influencing land use has been debated since the 1950s, when both M.G. Smith (1955) and Jack Goody (1958) were exploring the complexities of domestic groups.

Among the Hausa of northern Nigeria, M.G. Smith iden-

tified the *gandu* as a group of two or more men and their families sharing in a common unit of domestic economy, and he called this a 'composite domestic unit' (1955:19). The *gandu*, he continued, is one of two kinds of 'work units'--the other is the individual family of a man, his wives, their dependent children, and in some cases his widowed mother. The conceptual work unit consisted of persons related by common production and consumption of food, a single head, a common kitchen, a common granary, and a common farm. From Smith, then, farm work, land, familial relations, eating, and capital were related in this composite domestic unit called *gandu*. Relations between domestic groups were thus seen as complementary.

Goody (1958) started his analysis of domestic groups in northern Ghana by rejecting earlier Euro-centric assumptions about the family as a universal residential unit. Like Smith, he built on Fortes' notion of 'domestic group' (1949) rather than 'family' and was especially concerned with its role in food production. Drawing from the Ghanaian work, he emphasised the role of different groups in the food production process, outlining four main groups--farming (production), distribution, preparation, and eating (consumption), as well as dwelling (residence) units.

Goody introduced ideas on how the social interrelations of farming affect production. Noting that the core unit of <u>production</u> is a man and his children and that the core unit of <u>consumption</u>, defined as the process by which food reaches stomachs, is a woman and her children, Goody identified one

of the key conflicts in the organisation of farming in West Africa to which I will return later:

> ...the cooking groups, the units of food preparation,...form the basis of the internal differentiation of the units of food production (farming groups) as far as the process of distribution, preparation and consumption of food is concerned. (1958:78)

Goody also introduced the idea of conflict in the access to agricultural land resources within and between farming groups. From his data on farms, he showed that 'The differences in the agricultural practices...are principally a function of the availability of resources.' (1958:64) Fifteen years later, Goddard's (1973) comparison of three villages in the Sokoto area underscored the impact of differential access to natural and market resources on farming organisation. Deliberately comparing villages with different market access and ecological characteristics, he found that the *gandu* was strongest in a riverine village where commodity production complemented subsistence production to meet farmers' cash needs. In contrast, the *gandu* was weakest in a remote village where farmers relied on cash income from seasonal migration and off-farm employment (Op. cit.:215) Access to land resources and markets, thus played a significant role in influencing farming organisation and production.

Differential access to <u>labour</u> resources is equally as important to the discussion of farm structure. Both Smith (1955) and Goody (1958) questioned the appropriate units for

labour analysis, unsatisfied with the focus on the institution of household as the sole analytical unit. Their work showed evidence of farmers at different positions in the household structure having different access to labour. Hill (1972:43) depicted the *gandu* itself as a set of rights and obligations linking fathers and sons, as well as slaves in the past. In this way, the association of the household or family with an ideal, fixed institution was no longer acceptable.

Access to labour is determined by a set of rights and obligations between household members of different status. However, status changes, and rights and obligations--themselves subject to continual redefinition in different circumstances--can be undermined by changes in farming systems.

b. Re-thinking the household: Labour groups with needs.

Farm labour need not have been restricted to recruitment from within the *gandu*. Watts (1983:66), adding to the *gandu* debate, stated that 'The collective basis of household production was often expanded into larger work groups... called by indivdual farmers to overcome labour bottlenecks in the agricultural cycle.' Age groups or groups of workers recruited from different kin groups to perform specific, often agricultural tasks, are common throughout West Africa (Swindell 1985:129-134).

The *coup de grace*, finishing off the notion of the household farm as a fixed institution in West Africa, came from Guyer (1984) who, like Watts, was concerned with the

labour process rather than static institutions. Drawing from her work in Cameroon, Guyer showed that the organisation of farming, both cropping systems and labour aspects, must be understood from the perspective of its historical development. Exposing the fallacy of 'naturalist' explanations of farming organisation that suggest that the gender division of farm labour is derived from child care, Guyer proposed that it is related to '...women's relatively limited institutionalised means of mobilising labour.' (1984:381)

The productive activities of women, or to further subdivide, certain categories of women such as married and unmarried women, and married and unmarried men are determined by constraints on their access to land and labour. The relationships between social groups such as these, the ambiguity of what constitutes a group at a given moment, the changing contexts in which individuals come together, and the constant adaptation of groups to opportunities and pressures reflect the dynamism of the labour process.

Flexibility thus characterises household farm labour organisation. It is within this context that the realm of West African land use patterns--cropping combinations, tilling methods, field distribution, bush fallowing, bush extraction, intensification, location--must be seen as a cultural-historical transformation of a particular physical environment. Although these agro-ecological management skills of West African farmers have been recognised by agricultural researchers since the early twentieth century, they have not

been thoroughly documented or analysed (Mabogunje and Richards 1985:26-29).

Several themes useful for the analysis of Bamana farming emerge from this review of literature. Domestic groups farm together in different circumstances with different objectives. 'The household' is a shifting, context-determined institution, and ultimately a broad definition such as, 'households are what households do,' (Linares 1984:407) might be the most accurate. The organisation of farming depends on access to resources and control of labour. Individuals working together, however, may have differential access to the product of their labour, and also have unequal access to land and labour for their own farming operations. Depending on specific cultural and historical circumstances, outlined in Chapters III and V, such intra-household access to land and labour reflects the socio-political relationships of household organisation. Intra-household relations are a crucial factor in determining patterns of land and labour use in West Africa, which also makes them essential elements in the human-land relationship.

Households are indeed central to the analysis of farming in West Africa. Within them, between them, and outside them, though, are other social organisations, which overlap, develop, and transform. In the next section, I will show that it is an over-simplification to characterise pre-capitalist intra- and inter-household production relationships as complementary prior to the development of commodity production. The moral economy perspective helps to explain the

role of intra-village inequality as well as relations between peasant producers, traders, and the political leaders.

3. The Decline of the Moral Economy and Intra-Village Inequality.

i. The concept of a moral economy in peasant studies.

'The individual was able to exist only to the same extent as the community was able to ensure subsistence.' (Ernst 1976:57) This view of pre-capitalist Bamana farmers raises a crucial question about concepts appropriate to the study of Bamana household labour organisation and land use. What is the relationship between individual farmers within the village and beyond? The statement refers to the subsuming of the individual under the community, and as a consquence the individual's dependence on the complementary relationship between individuals and the community as a whole.

The statement about the individual relying on the larger community is consistent with Scott's (1976) position on the 'moral economy'. From the 'moral economy' perspective, the starting point for understanding the pre-capitalist farmers[10] is in the need of individual members of a community to assure their subsistence. In this view, pre-

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10. Scott actually refers to 'peasants' rather than 'farmers'. I use farmer whenever the reference is to persons making a living by growing crops. Peasant is a more general word either referring to countryfolk or to the peasantry as a class. In either case, all the residents of Soro in 1987 (besides myself and my wife) were both farmers and peasants. See Hill's (1986:8-15) critique of the use of the term 'peasant' for a further discussion of the difference between the terms.

capitalist farmers' production strategy was motivated by an inclination to avoid disaster by spreading risk. Through their relations with other members of the community--relatives and neighbours in other households--farmers reinforced this 'safety first' principle. By establishing such relations, farmers maintained an insurance against disaster through reciprocal obligations. These ties also included farmer-client relationships, and links between the poor, less powerful peasantry and elites, merchants, money-lenders, and the state, in which moral constraints prevented the exploitation of peasants. Even within an environment of inequality, peasants had a generally accepted right to subsistence, and thus the moral principle of this 'subsistence ethic' protected the individual (Ibid:5-9).

Writing with the influence of Scott's 'moral economy of the peasant', Popkin (1979) proposed an alternative view of the peasant. Rather than merely protecting subsistence, peasants, in Popkin's approach are problem-solvers, risk-takers, and decision-makers. Popkin is especially concerned with the peasant's evaluation of individual-group benefits. Village norms are culturally malleable, and constantly renegotiated with reference to power relations between individuals (Ibid:22). Peasants have more latitude to gamble than moral economists would suggest. They decide whether or not to make long-term investments in children or short-term property investments in cattle, land, or tools.

In Popkin's view, then, individual peasants are the central actors. They decide how and when they will interact

with groups. They act in their self-interest: when they see benefits for themselves they will reinforce communal structures of redistribution, but they always have the option to strike out on their own, and take a risk, by not contributing to the group. Commodity production is, in the Popkin view, a calculated risk. Potential benefits await the successful (and lucky) farmer who ventures into market production on his or her own. From this perspective, commodity production is not in conflict with subsistence, but a complement.[11]

The Scott-Popkin debate has inspired considerable comment on the nature of social, political, and economic relations within farming communities (e.g. Watts 1983:104-109), and there are lessons for the study of Bamana farming. Unfortunately, Scott says little of communities where the moral economy has been broken by the penetration of capitalist relations of production. In parts of colonial French West Africa including Côte d'Ivoire (Bassett 1985:97-98, 110-111) and French Sudan (Mali), the colonial state sought to increase commodity production by concentrating on different kinds of crops and making production more individual. The aim of the state was to break the balance that existed between the individual households and the community.

By favouring commodity producers and therefore stimulating the commoditisation of the production process, the

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11. In cocoa-growing areas in West Africa, for example, it has been argued that cocoa reinforces subsistence production (cf. Berry 1988, Guyer 1984).

policies of the colonial administration were inconsistent with the principles of the subsistence ethic. Redistributive networks--marriage dowries, age-set labour groups, gift-giving--within the community became monetised and self-interest replaced mutual aid in times of need. Moral constraints on merchant and moneylender exploitation of peasants began to disintegrate and disappear in areas where capital penetration of mostly subsistence economies was greatest (Ernst 1976:72).

ii. The decline of the moral economy in Mali.

It was through policies designed to end the exploitation of peasants by merchants and the recognition that peasant agriculture formed the backbone of the Malian economy that the leadership of the first independent Malian government established an elaborate rural development programme that was to 'transform' existing Bamana social institutions into modern cooperatives (Dembélé 1987, Diakité 1985, François 1982, Jones 1976, Ernst 1976). Those policies were contradictory, though, in that they sought to re-establish and reinforce village institutions such as youth labour groups and the household farming organisations which had developed within the moral economy. The assumed corporateness of communities in Scott's moral economy breaks down where commodity production and merchant capital are entrenched (Watts 1983:107). Under the first independent government of Mali, peasants resisted the changes that disrupted the relationship between producers, labour organisa-

tion, and village redistributive networks (Ernst 1976:82). Their resistance was in defense of the moral economy.

Discussion of the concept of moral economy broaches the subject of a paradoxical aspect of peasant relations within Bamana villages. Inequity exists between households and between farmers even though social norms may encourage modesty and the equality of all members of society. At the level of the village community, a moral economy exists. Through the operation of 'an egalitarian ideology', Bamana institutions encourage redistribution and thus minimise dependency relationships between households even though they do not eliminate inequality between households (Toulmin 1985:416).

Within the household, individual producers may be more likely to act as 'risk-takers' and 'free-riders' in Popkin's sense. This would explain the tendency for individual fields in Bamana farming to be associated with cash crop production, while household fields tend to be oriented towards assuring subsistence. The individual field (*jòn-foro*), in this view, tends to grow in importance '...because the producer can use its products at will, without coming into direct conflict with the norms of the extended family.' (Ernst 1976:121) Individuals within subdivisions of the household, then, may benefit from the insurance of the larger household to take risks that a household on its own might be less inclined, or less able, to make.

In addition to the phenomenon of cultivating cash crops on individual fields, migration also had the effect of reducing the power of the household head. Before indepen-

dence, the link between young men migrating to earn cash and the break-up of households had been established (Brasseur 1961, Millot 1959, Pâques 1954, Labouret 1934). Both Millot and Brasseur made the first efforts to place migration and the changes in household organisation within the context of the farming system. Millot (1959/II:26-27) suggested that the development of market gardening in some villages created employment opportunities for young people and thus could contribute to keeping labour within households where it would be available for dryland grain cropping. Similarly concerned with rural employment for youth, Brasseur referred to the transformation of age-set groups (*tònciw*) into farming groups to support a 'renovation of local agriculture.' (Op. cit:642).

The risk for an individual farmer, head of a field or 'farm' that is a subdivision of a larger household, to invest in an untested or unsure opportunity--such as cash cropping or migration--is never as great as it would be were the farmer independent and outside the household. The household group, inasmuch as the individual has not forfeited his or her right to its benefits, provides a safety net. The access to benefits from these subdivisions depends on the individuals' bargaining power (Toulmin 1985:381,392). That bargaining power may be related to the success of a household in securing constant food supply and marriage for its members (Hill 1982; Chayanov 1966). Large households thus provide economies of scale for subdivisions of the household (Richards 1983:21).

Bamana villages have been shown to have characteristics of moral economy relations. Both Toulmin (1985) and Lewis (1979) following Meillassoux (1981:45-47), showed how Bamana peasants' production is closely related to reproduction through the head of household's control of marriage; they also illustrated how the village community takes part in a wide variety of reciprocal agreements, not always balanced, and other social-political-economic relationships such as the age-group labour groups. With regard to production, despite commodity relations having penetrated rural communities, non-profit maximising rationales for change or resisting change often dominate decision-making (Lewis 1979:384-7). In this way, a subsistence ethic, such as that described by Scott, exists in Bamana village life.

Need this imply, though, that individual Bamana peasants will necessarily avoid taking risks to produce cash crops? The circumstances under which farmers work together determine their interests and influence their relations with institutions outside the household. The numerous factors constraining individual farmers have special relevance for agricultural extension because such programs have tended to aim at a single family farm head (Norman and Baker 1986:46). The nature of the multi-layered household, flexible in labour organisation, suggests that the question of farmers as individuals or collective farms requires an understanding of the subtleties of intra-household relations.

Although commodity production is a significant part of Bamana agriculture, a 'subsistence ethic' has not disap-

peared. The strength of the moral economy has undoubtedly declined in the last century, and especially in the last thirty years. However, the very slowness of the decline and persistence of peasantry suggests that the dryland Bamana farmers in this study remain oriented toward reproducing the household rather than accumulating capital and maximising profits in order to reinvest them as in capitalist farming.

So far, I have deliberately refrained from documenting structural constraints placed on farmers by the colonial state through the imposition of taxes, forced labour, and other requirements to concentrate on the concepts of household and moral economy. These constraints were not evaluated, or were given only cursory attention, in the contemporary literature, even though they no doubt played a significant role in the development of human-land relationships as well as in the lives of individual farmers.

Although data on farming from the pre-independence period are sparse, several important concepts became established and the origins of analytical trends were formed. A household farm with a head and subdivisions, plus a non-lineage labour group were identified. Farming households were seen as becoming smaller in size as labour migrated out of rural areas. Within farms, individuals under the head tended to seek independence when cash earning opportunities were available. These trends in Bamana household labour organisation and land use were prevalent at the time of independence. In the next section, I will draw on research from the 1960-80s as I present the three main questions inves-

tigated in this thesis.

4. Research Questions.

Since Malian independence in 1960, literature on, or related to, Bamana farming systems has proliferated (Krings 1987; Turrittin 1987; Toulmin 1986; Coulibaly 1985; Lewis 1985, 1981, 1979; Mazur 1984; Koné et al. 1983; Bagayogo 1982; Ernst 1976; Jones 1976; Leynaud 1966; Enquête Agricole 1964). A number of questions pertinent to the theme of conflict and complementarity in Bamana farming have been raised in this research, and have been guideposts in my own work. In this way, the particular questions that I investigate in this thesis are part of an ongoing synthesis and debate about peasant agriculture in Mali.

The field is the spatial manifestation of basic production units formed out of the changing social organisation of the household. I have mentioned the existence of different field types in West African farming systems, including Bamana. Can this diversity of field types be seen as complementary? Men have fields; women have fields. Young and old each have fields. There are dry season fields for crops dependent on well water irrigation, and there are the principal dryland grain fields of the rainy season. The produce of some fields has a market orientation, some a household consumption objective, and others a flexible mix of the two. The issue of conflict and complementarity can thus be addressed and constraints on production identified by examining the following characteristics of a field: 1) the social

group controlling a field, which refers to access to land and division of labour; 2) the agro-ecology of the field, meaning the intercropping, rotation cycle, soil cultivation practices, relation with non-crop plants and animals, and timing of the cycle of crops; and 3) the destination of the harvested crop, whether the field is producing subsistence or cash crops, or some combination.

i. Complementarity of field types.

What is the function of current field types as identified by farmers themselves? Have these changed from those identified earlier in the century, and if so, what does this change tell us about the nature of 'field types'? The importance of field types rests fundamentally on the role of the field as the site of agricultural production. The first Malian government's village collective field programme has been criticised for mis-identifying the multiple farming system roles of the basic agricultural production unit, a field type (Jones 1976). Through the identification of the physical field, its dimensions, crops, cropping techniques, labour input, and destination of its product, the field type takes on meaning at a point in time (Koné et al. 1983). But like the household labour groups with which it is closely related, the field has a history and changes. It also has an agro-ecology manipulated through the knowledge of farmers, and constrained by movements of change, such as climate or political-economy, broader than the actions of individuals.

One would want to know how the observed social formation of 'field' has changed over time with the abolition of slavery, colonial intervention in the form of taxes and labour requisitions, growth of Islamic practices in rural areas, Malian independence and new rural development programmes, and the expansion of the market. It is beyond the scope of this thesis to try to trace this history, but lessons about changing farm organisation can be drawn from elsewhere. The 'synchrony', or 'task interdependence' of men and women, underscored links between power and production in the history of the gender division of labour in Beti farming (Guyer 1984:18). This synchrony opens the question of complementarity of farming activity in the different kinds of fields.

ii. Balance between tilling, labour, and ecology.

Ploughing is a relatively recent soil tilling technique in West Africa (Ruthenburg 1980). Responding to the historical question of the absence of the plough in most West African farming, Richards (1983:26) suggested that the question itself is part of a broad misinterpretation of West African farming and that other soil management practices common in West Africa are indicators of intensification.

West African farmers have tended to till soil with a hand-held hoe. When Dudley Stamp (1938:34) visited Nigeria, he was struck by the <u>intensive</u> care of the soil by hand hoeing. With regard to the maintenance of soil fertility in bush-fallow rotations south of the Sahara, tilling by hand-

held hoe only disturbs the surface of the soil. In contrast, ploughing '...leads to a deterioration of the soil structure and rapid decomposition of organic matter, thus increasing erosion.' (Steiner 1982:110) A recent report from east of the study village of Soro suggests that ploughing disrupted the agro-ecology of Bamana dryland farming (Krings 1987). The contemporary minimum tillage studies of West Africa (Lal and Greenland 1979) thus draw from the historical precedents set by West African farmers.[12]

But, is the farmers' agro-ecological knowledge the only factor influencing the use of the plough? Others (e.g. Lewis 1979) have indicated that there are other factors, such as household organisation. What is the relationship between tilling technique, household organisation, and peasant ecological knowledge? Why do some farmers plough and others mound?

The decision to plough or hoe may not necessarily be a simple function of access to the means to plough. The complexities of this ploughing question were brought to light in John Lewis' (1979) thesis showing how both crops and descendants constituted 'twin poles of production'. Heads of households were as concerned with reproducing the lineage as with producing food to feed the members of the household. What about the heads of farming sub-divisions of the household? Are they likely to plough, if they can, thus reaf-

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12. Recent work in the United States and Japan (Poincelot 1986, Fukuoka 1976) has also contributed to the understanding of the value of minimum tillage.

firming the individualist explanation of personal field motivations, or to mound, suggesting that the protection of soil fertility is a universally recognised factor in tilling decisions?

iii. Commodity production conflicting with subsistence production.

What is the relationship between commodity and subsistence production, and what are the parameters for studying this relationship at the village level? The development of cash crops, especially groundnuts and cotton, in dryland Bamana farming systems preceded the independence era. In northern Côte d'Ivoire, the colonial state promoted individualised production units by aiding the disintegration of the moral economy in which the heads of Dyula households had authority (Bassett 1985:97-98).

How do peasant farmers organise crop production to provide food for their dependents and sufficient surplus to sell for cash? Are subsistence and commodity sectors complementary, or do they compete for scarce labour or land? What are the constraints on their production? How subsistence farmers can primarily produce a surplus for the national economy and benefit themselves remains a national challenge. Subsistence and commodity production may 'conflict' in terms of contradictory production objectives (Grossman 1984:6-10, Bassett 1985:111, Bernstein 1979), but peasants may also have strategies for organising their labour and making use of their land in order to derive maximum

benefit from cash crop opportunities.

The next section outlines how the thesis is organised to answer the questions I have raised in this introduction.

5. Summary of the Chapters.

In the next chapter on the field methodology, I describe some of the bias and selection made in the conduct of the research, the participant-observer strategy employed, how data were collected, and some of the limits of the data. In Chapter III, I emphasise the continual adaptation to the land that has led to the development of complementary production activities in different spatial zones of the village. Concepts of village space are considered. Drawing from oral history accounts, I sketch the process by which the village land was settled in a dispersed pattern to minimise land use conflicts as well as distance between residence and field. In the fourth chapter, I show how the colonial state implemented two distinct patterns of intervention in this village setting. These interventions in the peasant economy affected both labour and land use, injecting new forms of conflict into relations between farmers, and between farmers and those outside the village.

In Chapter V, I examine the relationships between farmers in the social structure and show how these affect access to land. What does the difference between field types in terms of area and in terms of labour intensity working them suggest about inequality within and between households? The notion of field types as complementary production units is

raised; and then, that complementarity is questioned because it assumes a perspective of the household head.

The role of labour groups exploiting land resources is investigated further in Chapters VI through VIII as the focus becomes the selection of appropriate land resources, the method of their transformation, the labour involved, and the production objectives of the labour group. Each of the chapters refers to production areas within the study village: respectively, the bush, the fields, and the gardens. With the focus on land, are farmers exploiting diverse land/resource types such that the production of each complements the other? If so, how is this complementary and what processes might suggest that they could come into conflict? With the focus on labour, what are the characteristics of the labour in each area and what evidence is there from these characteristics of differential control over production?

In Chapter VI, on the bush, I outline the characteristics of the savanna ecosystem and climate of the region. The ecosystem and climate are treated as natural resources understood, transformed, and exploited by the peasantry. Attention is given to plants in the non-cultivated sector which play important roles in the domestic economy. In Chapter VII, the dryland farming system itself is the focus, especially the agronomy and allocation of labour. I show the multiple objectives of farmers. In Chapter VIII, also, I give agronomic details, but on the growing of fruits and vegetables in the market garden sector. In the three chap-

ters, I look at how the produce of the different zones is related to subsistence and commodity production, what the ecological characteristics are, who in terms of the household is most involved, and what the objectives of the producers are.

Finally, I conclude with a synthesis of the results and the significance of their implications. The relative conflict and complementarity between different field types, within agro-ecological relationships, and as part of the production of crops for subsistence and for market is evaluated. Special reference is made to the constraints on production found in the study and what their implications are for improving conditions for farming. The implications for the role of national development policy are considered.

Chapter II.

Field Methodology

Human geographers conduct research using a variety of techniques. Some emphasise quantifiable data collection, others information to support a qualitative argument; some first seek statistical records, others must muddy their boots, and still others want remotely sensed data. The diversity of techniques within the discipline enriches the geographer's tool kit for empirical research. The objectives of the research might suppose that, for example, aerial photographs would be the best tool in the analysis of land use change outside a major city. Land use change on an urban periphery could, however, be studied through the culling of archives, interviews of policy makers and residents, or a survey of current land use practices. All would provide insight on the question; moreover, a combination of techniques would give researchers an opportunity to draw from a variety of sources, and the breadth of exposure to evaluate the relative strengths and weaknesses of the data sources.

Throughout the process of enquiry in the field, infinite points arose where I had to select, thereby injecting some kind of bias into the data. This chapter shows some of the known biases in this study, why certain choices were made, the impact of bias and selection on the direction of the research, and some of the limitations of the data.

1. Researcher and Culture.

Before arriving in Mali in January 1987 to conduct research on Bamana farming, I had been in the country on two occasions. An initial factor to consider in the bias of this study, therefore, must be my non-Malian background. Whether one undertakes social science research within one's own culture or within a culture where one is perceived as an outsider can affect the conduct, methodology, and outcome of the research (Bulmer and Warwick 1983:206-210).

At the top of the first page of notes I took on 17 February 1987, the day after my wife and I moved into a room (*bon*) in a village near Wèlèsèbugu[1] (80 km south of Bamako), I wrote 'I am Alu Samake. L.Y.B. [my wife's initials] is Maramu Samake.' These were to be our new names, and new identities while in the village. These new names are significant because my wife and I are not Bamana, Malian, or of African descent. Our physical features, mine northern European blond and hers Japanese-German, made us stand out. So too did our United States cultural background.[2] We had preferences, for example, for a certain cuisine, gender division of labour, sleep regime, and privacy that also made us stand apart.

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1. This location was the first of two village study sites: 1) 16 Feb.- 30 Mar. in a village the name of which I will keep anonymous since I never spoke with villagers about publishing its identity, and 2) 5 Apr.-30 Aug. 1987 in Soro, the principal study village.

2. To our hosts we were *tubabu*, *nansara*, or *farajè*, although my wife was occasionally hailed as Mme. Chinoise on the streets of Baginda and Bamako.

Our problems of integration with the study community were very different from those that a Malian researcher would have studying a rural community where his/her relatives lived, just as they might be were we to work in our own home communities (Diawara 1985). Diawara sought a balance between meeting the objectives and testing procedures required for acceptance in the broader research community, while at the same time conforming to social norms in order to fulfil the expectations of relatives and friends within the group that was the subject of the study.

Familiarity with local history, social norms, and language all posed challenges to us. Obviously, the two previous trips helped with general familiarity, and with the aid of several friends, I received generous coaching on appropriate social skills. Our identification with Malian nationals rather than the visible expatriate community of Bamako immeasurably enriched our understanding of Malian culture and ability to communicate our research objectives. A geography field methods manual notes that 'Identification with an expatriate, propertied or urban elite may preclude advice and respect for integrity from officials lower down in the hierarchy as well as those outside it altogether.' (Dixon and Leach 1984:7) I was mindful of respecting the procedures established by the national government for foreign researchers.[3]

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3. These included a research permit (No. 43, 9 Jan. 1987) from the Ministry of Education stating the nature of the research, local and foreign research institutional bases, beginning and end dates of research, financial support, and the areas of Mali (*cercles*) where the fieldwork would take

To study the Bamana agricultural system, I needed to see how farming operated, where farmers selected sites to cultivate fields, when and how they sowed, in sum, to find out by observation just what the 'system' was. Because Bamana farmers number in the millions and are spread over a vast area, I had to select where I would concentrate my efforts. I chose participant observation as a data collecting technique primarily because the study called for examining complex social-environmental relationships. To develop an intimate understanding of the context of farming and its association with those social and environmental relationships, participant observation offers advantages over sample survey methods (Warwick 1973:190-1) and is thus recommended in the farming systems approach (McKee 1986).

2. Study Site Selection.

I will go into some detail on the village selection and residence-taking process to illustrate the multi-faceted elements entailed in the concepts of bias and selection at the village level. Richards (1983:10) has noted that the village selection process in the field methodology of studies in West Africa is frequently neglected.

As conceived in London, my research plan involved three

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place. I was also required to submit a preliminary report of the results of the research and promise to supply a detailed final report not more than six months after completing the research. To purchase aerial photographs, I received the written permission of the National Director of Topography, and for access to the national archives, I received written permission from the National Director of Arts and Culture.

study villages, one principal site where my wife and I would live for most of nine months, and two for comparison where we would spend no more than four weeks each during the period. The villages were to be located in three different areas: 1) the Sikaso Region where the cotton company CMDT would have an influence, 2) somewhere mid-way between Sikaso and Bamako in the Buguni or Wèlèsèbugu areas where limited earlier village-level geographic and historical documentation might provide a point of comparison, and 3) near Bamako, closer to the largest urban centre of the Bamana zone.

For each of the three areas, I had contacts upon whom I could depend to 1) give a candid appraisal of the strategy, and 2) if feasible to recommend certain potential villages where initial contact could be made. I had a contingency plan to look for a study site in the Segu area where other Bamana farming systems surveys had been conducted (Turrittin 1987; Toulmin 1985; Lewis 1979), but where I had no direct contacts.

With this rough outline, immediately after arriving and obtaining research clearance in Bamako in January 1987, I began to consult with social scientists at: the Institut d'Economie Rural, a planning, research, and documentation body of the Ministry of Agriculture; the Direction Nationale des Arts et de la Culture (DNAC), notably at the national museum and cultural heritage divisions where there is much field experience with and without foreign researchers; and at the Institut des Sciences Humaines (ISH), a social science research organisation of the Ministry of Sports,

Arts, and Culture.

The narrowing down to four possible study sites came with sociologist Maximin Samaké at ISH who knew the Wèlèsèbugu area both as his home and as a researcher. He, Cheick Oumar Mara of the Cultural Heritage Division of DNAC, and I discussed the advantages and disadvantages to my research of the study village size, ethnic composition, farming techniques, Bamana or Islamic religious influence, proximity to markets and roads, involvement with a rural development programme, presence of school and infirmary, and experience with researchers or resident foreigners.

With four possible sites for a principal study village in hand and plans made for selecting the comparative sites near Sikaso and Bamako, my wife and I travelled to Wèlèsèbugu accompanied by Mara, a friend since 1980, knowledgeable fieldworker, and experienced assistant of foreign researchers.[4] The trip's objective was familiarisation with the area, including: permission from local government authorities and village leadership, as well as 'legitimization by other powerful agencies or individuals in the community' and 'the choice of exact research techniques, the determination of sampling type and size....' (Kearl 1976:20, 22) Over four days in Wèlèsèbugu, we spoke with the Chef d'Arrondissement (commonly referred to as the *commandant*), the *dugutigi* 'head of village' of Wèlèsèbugu, three local school

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4. Among others, Mara has assisted and been acknowledged in the publications of John Johnson (1986), Kate Ezra (1986), and Charles Bird (1974).

teachers, two Catholic missionaries, and a Peace Corps volunteer.

The talk with the *commandant* coincided with a visit by a resident of one of the villages which we had selected in Bamako as a possible study site. When we spoke of those four villages, the accomodating *commandant* turned to the elder farmer and said that he should show us the way to his village and to make us feel welcome. We thus borrowed a moped and set off behind our new host. A village council meeting was convened and it was decided--*dugutigi* and *gatigiw* 'heads of households' in attendance--that we would be accepted as residents until September when the study would be completed.

The practical problem of housing was discussed. Another Peace Corps volunteer had lived in the village in her own house. That house was now the school teacher's and there were no other vacant buildings. Nonetheless, the farmer who had been at the *commandant*'s took us back to his compound and showed us where we would stay. It was a room then occupied by one of his wives.

At this point we recognised the difficulty in controlling village selection. The arrival of outsiders in a village, where the community is drawn together by lineage ties, common activities, language, and a common history, in order to study certain facets of the culture is uncommon to say the least. To seek temporary residence for persons wanting to learn about farming is a highly irregular request. Rental housing units do not await transient social scientists.

When we explained our interests to the *commandant* and other leaders, they listened, inspected our research permit from Bamako, and evaluated just who we were. To next have an offer to house us in one of the villages we had selected in Bamako implied that if we had honestly stated our interest then we should consider ourselves very fortunate. Having come so far, we could only accept.

We returned to Bamako to assemble provisions for living in the village and to borrow and purchase those we did not have. We were back in the village by 16 February where we lived for six weeks. The time was spent improving our Bamana speaking ability, as well as learning how to live in a Bamana village, and investigating how families and their agricultural labour are organised, the names of plants, soils, field types, and crops.

The decision to relocate at the end of March followed 1) increasing discomfort in our living arrangement including notably our relationship with our host (*jatigi*), and 2) health problems. In Bamako, Mara, Dr. Soumaïla Diakité, National Director of Arts and Culture, and Dr. Louis Brenner of the London School of Oriental and African Studies all helped me decide that I should seek a better environment for conducting the research. We weighed the consequences for the research of the problems versus relocating to a village closer to Bamako where we could seek emergency medical help should it be necessary. The school teacher in the village, who knew our host and understood the problems we were having, helped us to graciously take our leave. We met with

the chief and elders explaining the health difficulties, diplomatically omitting the other problems.

I re-evaluated the village selection plan and sought to make arrangements to settle in a village closer to Bamako. By now, we could see that the three village plan was overly ambitious. Each community has its own history and geography which is multi-layered. A quick visit would imply the collection of only the most superficial data which, from our own experience we knew would more than likely be incorrect. Gaining the understanding and confidence of farmers, the study subjects, takes time and patience (cf. Ogunfowora, in Kearl 1976:52-3). With the Wèlèsèbugu experience still fresh, and our minds fixed on preventing a repeat of our false start, we set out with Mara and a friend of his to the Arrondissement of Baginda where this friend had contacts in several villages.

We sought a smaller village--the one outside Wèlèsèbugu had over 1200 residents in two spatially distant quarters--so that we would be able to sample all farmers. At a smaller scale, I felt that I would be able to include <u>all</u> household fields in the study, while at the same time obtain data on land and labour at the village level. This would be far preferable to imposing a selective survey strategy after recording the sampling frame. Obtaining the statistical ideal of a random sample is rare in any situation (Allan 1974:8), and as a foreign researcher I knew randomness would be even more hard to achieve. To eliminate potential problems, I sought a population small enough to cover completely and in

so doing to also be in a village close to the average size of a Malian village.[5] On 2 April 1987, we made our initial contact with what was to become the principal study village. On 5 April, I moved to Soro, with my wife joining me a week later.

The exact village where we finally conducted the principal data collection was selected with the assistance of others more familiar with local conditions but within the parameters I specified as necessary for the research. That village, Soro, shares a common history and geography with many other communities in the zone, thus allowing for the comparison of observations made there with those recorded elsewhere. In the language of time-space geographical theory, the individual life paths of Soro residents, though peculiar one by one, together may represent an imprint similar to that of other Bamana, Malian, savanna, or even dry grain farming communities.[6]

3. Data Collection.

We employed a variety of data collection techniques. Participant observation and simply bystander observation (etic) were, as indicated, most important for general learning about the cultural and environmental contexts of the Bamana farming system. Several series of formal interviews

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5. Jones (1976:265-6) commented that although the Malian national average village size was around 400 persons, research was generally conducted in much larger villages.

6. Hill (1982) proposed dry grain farming as an agrarian system that can be compared across different cultures.

were also useful. During the hot, dry season in April and May, I interviewed and collected field and crop details from thirteen farmers who were growing crops at that time (For data sheet, see Appendix A). This was an incomplete sample and it was conducted before I knew the extent of the sample frame.

Just before the wet season began at the beginning of June, I used a ten question interview with heads of households, or if not available another adult in the household, to collect background information on each production unit--location of fields, number of workers, crop types, approximate production the previous year (1986) (For questions, see Appendix A).

Once the agricultural season was underway, a more thorough interviewing schedule was drawn up to cover the heads of all field units: *forobaforo* heads, *jònforo* 'personal field' heads, and *nakò* 'garden' heads (For questions, see Appendix A). These interviews included 18-20 questions, depending on the field unit, and included a mixture of single response questions and open ended questions. Most of these interviews took place in the farmer's field during a rest break. A few farmers were not interested, tired or were confused by the purpose of the questions, and the questioning lasted five minutes or less. Most were very interested in explaining in detail about farming, with a number of discussions lasting over an hour. Because the questions were designed to allow for quick responses or elaborate histories, these interviews succeeded in drawing out much in-

formation on fields and farming. For three of these interviews with the heads of household fields, I drew up special questions related to history and invited Mara to translate the sophisticated Bamana responses into French.[7]

From the first sowing of maize in early June until the last sowing of millet (entire grain sowing period) in mid-August, my wife and I regularly visited each of the 22 household fields and less regularly the personal fields and gardens to note labour allocation, farming techniques, crop types, crop growth, pest damage, and other related agronomic, ecological, and cultural characteristics of farming (For sample sheet, see Appendix A). Rarely were these visits limited to cursory inspections, which would have been unacceptable behaviour. We would exchange greetings with those working in the fields, and in many cases also with those working at the house to prepare and bring food to the field. Sometimes we shared a meal in the field during which time we would learn more about farming and also reciprocally answer a variety of questions about the world, e.g. 'How do you ask "*Bamakokaw bè di*?" 'How are the people of Bamako?' in French?', 'In which direction would I go to reach China?', and 'Why does America build so many weapons when Bamana

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7. While I preferred to work without a translator, struggling with the language where necessary, I sometimes misunderstood or had a false conception of the cultural context. When farmers used proverbs (*ntalenw*) to illustrate their explanations, I had a particularly difficult time in first understanding the literal meaning and then the connection to the topic under discussion. The translations were also especially helpful with some of the older farmers whose toothless enunciation I could not understand.

farmers have so little wealth?'

Fields were measured primarily by pacing off one metre lengths around geometric shapes to obtain the area. We periodically measured our paces with a tape measure to check for accuracy. Muddy fields, mounds and furrows, and tall grass or millet all added to the challenge of measuring fields. Farmers were interested in knowing the size of their fields, especially to compare with any sorts of payment per hectare that they were charged.

Although we lived with one family and were concerned about possibly being torn between giving them special attention in the study and covering all units impartially, we were able to spread our time with all families including those living in distant hamlets (*bugudaw*). Visits to the fields of the families in hamlets and the distant fields of families residing in the centre were physically taxing. We owned a moped, but for field visits I preferred to go by foot to have more observation time especially in the bush and to decrease the foreigness of our study and visits.

Outside the village at the national archives in Bamako, I sought historical documentation on the early colonial agricultural development in Baginda, a nearby forest reserve, and any references to either Soro and its environs or to peasant household organisation. My probes at the national archives did not reveal a great amount of pertinent data. Unfortunately, many documents had been destroyed by termites, and in general, there is little historical documentation of peasant agriculture. I also read at the

libraries of the Ecole Normale Supérieure and the Institut d'Economie Rurale, both in Bamako. Finally, I had discussions with local agricultural extension agents which greatly contributed to my understanding of the government's *tòn villageois* rural development programme.

4. Problems of Data Collection and Shortcomings of the Data.

Although many of the problems I encountered are discussed in field methodology papers and books written by others (cf. Kearl 1976), some comment on the two areas of approach and interpretation are important to the evaluation of the data. Approach refers here to the method of collecting, for example, labour and agronomic data relevant to the study of field types, agroecology, and production. Interpretation is the mental processing of physically perceived stimuli (sights, sounds, etc.).

First, taking the agronomic data, we sought information on crops and cropping techniques to document such features as plant growth and development, soil tilling and fertilising, crop combinations, and plant protection measures. We concentrated our data collection efforts on the period of most intensive plant growth and agricultural work. The timing of the intensive survey corresponded with the sowing and weeding period, so data on early crop development, tilling, intercropping, fertilising, and protecting are strongest. Harvest data are weakest.

The data do not include soil nutrient analyses which

would be useful in comparing 1) the relative equality or inequality of land-holdings, and 2) the fertility of the soil on the ridges and furrows of a ploughed field versus the soil inside a mound made by hoeing. Additionally, a longer period of study might have revealed more about the differences between parcels that have been ploughed and those that have been under a mounding regime for a given period, say, 3-6 years and 7-10 years. Such long-term studies of land parcels have shown the changing use of the parcel through time and land degradation as fallows become shorter, but I do not know of any studies over long periods comparing different tilling regimes.[8] Longer studies would show the changes due to different periods of annual rainfall, such as the higher rainfall of the 1950s and lower rainfall of the 1970s-80s. They would also highlight the long-term impact of continuous cropping on parcels. Where aerial photographs and farmers' accounts indicate continuous cropping with hoed mounds for up to fifty years, as they do in several areas of Soro, precise soil data on organic content, decomposition rate, inorganic content, compaction, texture, and erosion rate could provide the basis for furthering the soil science understanding of farming methods.

The aerial photographs available for the study are from

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8. The unusual work of the Marchals (Marchal J.Y. 1983; Marchal Monique 1983) in Burkina Faso is exceptional in its detailed study of land use change over time using a combination of aerial photographs and documentation on the ground of the human modification of the landscape. There are, however, no tilling comparisons. IITA in Ibadan has championed the study of zero-tillage in West Africa (e.g. Verinumbe et al. 1984; 'Zero tillage' 1983, Lal 1979).

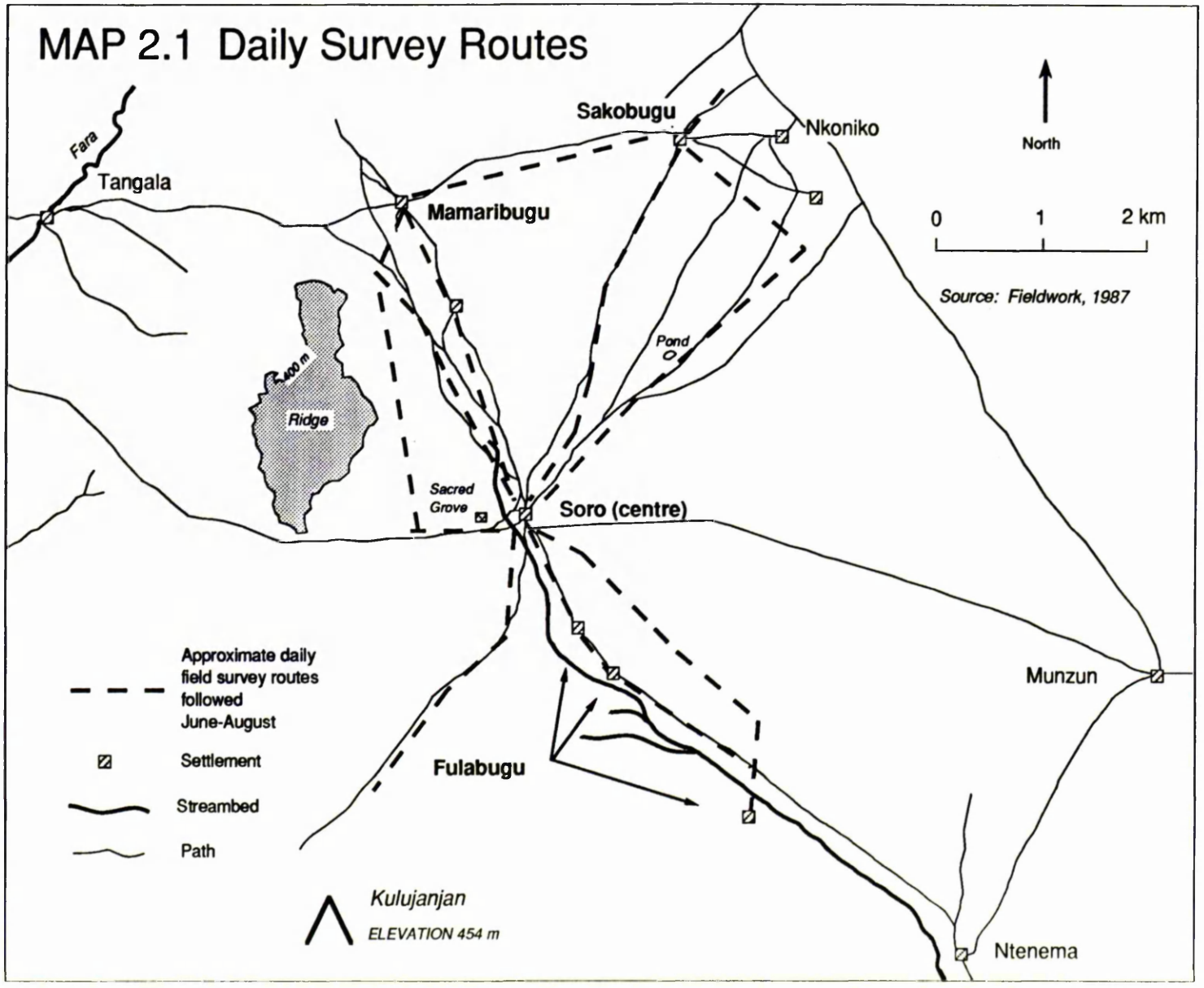
1957 and 1974. An up-to-date 1987 aerial photograph would have made possible more land use comparisons of field types. The maps of fields in the study use data from these sources and the latest Institut Géographique National (IGN) 1:200,000 map (which uses the 1957 photographs as a base), as well as data we collected on the ground. Inaccuracies may have been brought into the maps at each stage in the map production: the IGN map has many place-name mistakes (e.g. Soroba for Mamaribugu) as well as non-existent roads; the standard distortions of aerial photographs plus the rather blurred quality of the 1974 photograph; the measurement of parcels in the field; the registering and digitising of the IGN map and the data from the aerial photographs; the generalising of cartographic data by the ARC/INFO geographic information system; the transfer of data into the final graphics software system used to create the finished map.

In the case of the labour data, the objective was to record who was working where, when, and for how long, as well as finding out what farmers were doing and how they were doing it. We could not <u>always</u> be watching every field. Each individual farmer could have worked in <u>several</u> spatially separate places each day but not necessarily every day. The field parcels were fixed in space over a large area, though they came into operation irregularly and unannounced throughout the survey period. Once we found a site we could watch it on a regular basis. The individuals working at each site, however, moved around. The daily paths of individuals converged at certain sites at certain times, and

diverged, making the tracking of labour extremely difficult.

Since we could not be in all places at the same time, we worked out a plan whereby one of us would visit each household field and all sub-household fields of about a third of hectare and larger every other day (Map 2.1). We relied on the recall of farmers for information on their activities during the day, or days of work since we had last seen them. Not everyone recalled each of the tasks performed in the past. We thus tried to apply our goal of visiting parcels every other day to asking individuals labour questions every other day. Not every farmer works every day. Crops in some parcels, such as fonio, require intensive labour over a day or two and then none until harvest. Some parcels are abandoned mid-season. In some cases, we did not see certain farmers or fields for over a week. As the number of field units multiplied during the growing season, we had to put a higher priority on collecting data from household labour groups than from the individual field units.

The question of what constituted work was also a problem in collecting labour data. Is sitting in a field work? Is an afternoon nap work? Is bird-scaring and watching work? Regular meal breaks and rest breaks are a part of a working day in Bamana farming, and thus are included in the figures. Neither a Bamana farmer nor a Western office worker would extract one or more 15-60 minute breaks from the calculation of his or her work day. What, though, constitutes <u>agricultural</u> work? Is collecting shea fruit or


MAP 2.1 Daily Survey Routes
Fara
Tangala
Sakobugu
Nkoniko
Mamaribugu
North
0
1
2 km
Source: Fieldwork, 1987
Pond
400 m
Ridge
Sacred Grove
Soro (centre)
Approximate daily field survey routes followed June-August
Settlement
Streambed
Path
Munzun
Fulabugu
Kulujanjan
ELEVATION 454 m
Ntenema

fuelwood, in and around a field where one has spent the morning and will again spend the late afternoon, considered agricultural work? In recounting the childhood joys of visiting his grandmother's village, the Guinean writer Camara Laye illustrates the ambiguity of defining farming work:

> With my little playmates I would...scare the birds, and sometimes the monkeys that came to raid our fields. At any rate, that is what we were supposed to do, and we did it without grumbling, for it was more of a pleasure than a duty. But it sometimes happened that we became absorbed in other games, and forgot why we were there. (Laye 1954:41)

Much village space is indeed multipurpose. Gardens and fields are child care sites as well as crop producing land. Gardens are sometimes used for washing clothes. We used the definitions of farming work that the farmers themselves considered important and our observations of the work that was needed to guarantee a harvest. Judgements and estimations were necessary.

We did not attempt, however, to quantitatively estimate the differences between workers. From our observations there was more difference in the quality and speed of work between individuals than between men and women or age categories. One is also faced with comparing the crop protecting work of children scaring birds in the manner of Camara Laye, with the back-breaking work of weeding alone with a short-handled hoe in full sun and the temperature at 37°. In addition, household agricultural labour studies tend to make no mention of the supporting work that is not strictly agro-

nomic often provided by young women and children. Those who prepare food and bring it to the fields save valuable time for the agricultural workers in distant fields. Messengers also provide a service to the workers in the fields.

Interpreting the data was another problem in data collection. Literal understanding was itself a challenge: knowing the language and being in the right place at the right time to perceive relevant data. Where possible, I conducted interviews in the fields during a farmer's rest break. There, the farmer and I were surrounded by the subject of my interests, making it an appropriate setting. Some of the questions in the interviews, however, were misplaced or misworded which I discuss in the appendices with each set of interview questions.

Having understood the literal meaning of a farmer's comment or explanation, interpreting what he or she really meant provided another, complicating level to collecting data. Although I was more interested in the literal meanings and the basic attributes of farming, I was aware of other levels of knowledge about farming. A farmer's public and superficial answer to a question about the difference in crop performances of two parcels may be very different from his or her full understanding of the difference.

Gauging someone's view of a vague concept like change, improving conditions, or development is fraught with difficulties. Of particular difficulty is interpreting the 'frames of reference' (Tapper and Tapper 1986) or context within which farmers, (and farmers-researcher, i.e. myself)

were communicating. Crop problems might be diagnosed privately, for example, with reference to human fertility rather than field ecological conditions, pointing to the relevance of alternative rationalities. Some of my questions, such as those related to improving conditions for farming and defining development, elicited responses, the full meaning of which I could not interpret.

Conclusion

More details on the methodological procedures and problems will emerge in the text. Here, I have tried to give an overview of how we set out to, and finally did, gather information on the farming system. The data were not collected to cover every aspect of farming in Soro, much less all Bamana villages. The research was aimed specifically at determining the interrelationship of labour and land with particular reference to constraints on production, the field types, agroecology, and production objectives of the farmers.

In the next chapter, I will show that in the study village current residents have settled and transformed the land in a distinct pattern reflecting both their historical background and their contemporary production activities.

Chapter III.

Village Settlement History and Spatial Organisation

Having discussed the household institution and its role in labour organisation and land use in Chapter I, in this chapter I will investigate the historical origin of households in the study village and will introduce some of the key elements of the spatial and social organisation of farming in a Bamana village. The complementarity within the farming system will be viewed from the perspective of farmers' continuous adaptation to social, political, economic, and ecological change.

The first section is organised around the historical development of the case study village. I will show how the founding of the village took place only about one hundred years ago during a particularly tumultuous period in the history of the Bamako - Kulukòrò section of the middle Niger when the *kafo* denoted Bamana political territory. Certain people came to found the village, and they brought with them their way of doing things, significantly for this study, their way of using the land and farming. From this historical development of the village, albeit only briefly presented here, the origins of contemporary spatial patterns influencing agriculture can be seen; and more importantly, I show that adaptation and change, not stagnant 'traditionality', have characterised human-land relations in the region.

To understand who the people were who first settled the village, I focus on the role of identification with eth-

nicity and the *jamu* 'family name' influencing settlement pattern and field location. As in other West African settlements (Akasaka 1973, Brasseur 1968, Villien-Rossi 1966), residents of Soro live in hamlets, quarters, and houses clustered in a pattern that reflects ethnicity and *jamu*.

In the second section, I will present two models for conceptualising village space. The first relies on the complementarity of three basic Bamana spatial distinctions as the point of departure: village, field, and forest/bush. A people's image of land is based in concepts which often stem from belief systems. For this reason, some of the concepts from the literature on sacred space are relevant to understanding village spatial organisation. The second model is derived from von Thünen's rings of economic activity radiating out from the houses of farmers in a village. Aspects of these models are evaluated as tools for conceptualising villages as centres of agricultural production. Villages and household farms have been key points of state intervention in the peasant economy, the topic of the next chapter. Where the state has tried to change production by peasants it has necessarily affected the organisation of space.

1. Historical Development and Settlement Pattern.

i. The founding of Soro.

Drawing from oral history accounts collected in Soro and several published sources, I have tried to piece together the local history of Soro at the time of its founding. Descendants of the first chief (*dugutigi*) of Soro

remember Miemba Cèbilè Kulubali as the founder of the village.[1] He was the elder brother of Sajè Kulubali, founder of Munzun (Map 1.1). They founded the respective villages during the Samorian era (*samoritilela*), the 1870s-1890s when Samory Ture was building a great state in the upper Niger basin. They were originally from Segu, left to fight Samory, and afterwards settled at the present sites.

The earlier name of the village was Soronba, meaning 'big-' or greater Soro', to distinguish it from the later village of reduced population.[2] Indeed, Soronba was said to have been flooded with refugees from the Samorian wars in the south. The landscape certainly shows traces of earlier settlements. Within a radius of two kilometres of Soro, we found evidence of ruins in nearly every household field, but dating these ruin mounds (*tomo tintinw*) is difficult because houses erode quickly. Potshards at one site, however, were of a decorative pattern no longer in use, and they had features in common with pots of the area dating to the 1700s. On the banks of the *kò* 'streambed', iron slag heaps (*nègè bòw*) are visible which Soro residents say were left by the many *numuw* 'blacksmiths' making weapons during the Samorian (Soronba) era. Without further investigation, though, it would be difficult to speculate on the chronology of these ruins.

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1. Miemba would have been his mother's name. The mother's name is used to distinguish him from his half brothers.

2. The 1957 IGN 1/200,000 Bamako-Est map mistakenly marks Mamaribugu as Soronba.

Village sources say that those who sought refuge in Soro were *banimògòw* 'people from the Bani River [tributary to the Niger]', especially from Baniko[3]. They came to this village because of the reputation of Soronba Kulubalis to stand up to bullets: *'nègè t'u don'* 'Bullets don't enter them'. The showdown between Soronba and Samory's army never occurred because the French captured Samory, and the refugees returned to their home regions. The main discrepancy with this version of Soro's history is that the village never had a fortified wall (*tata*) as did the older village of Muntugula 10 km east known to have existed during the Samorian era (Méniaud 1935:79-80).

Although the precise orgins of Soro are not clear, the current Soro Kulubali line dates to at least the 1890s, and probably to the 1870s. The other lineages came to Soro later for various reasons which will be discussed later in this chapter. Founded in this era, Soro is not one of the older Malian villages where research has been conducted.[4] Still, the cultural heritage of today's residents of Soro includes a long association with the area, dating back over one hundred years. During that time, the village has established an intimate collective knowledge of local natural resources and agricultural production.

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3. The *banimògòw* were probably Bamana and came from what are today the *cercles* of Dioïla, Bla, and San (Letter from Mara 1988).

4. For example, Lewis dated Dukolomba to about 250 years ago (1979:66); Turrittin referred to Kenceri as the largest village between Segu and Kucala during the Segu state era (1660-1861) (1987:96).

ii. Regional political territory: *kafo*.

The institution of *kafo* was broader than the village (*dugu*), since it was the grouping of several villages for mutual protection and often related through the payment of tribute. It was also a political unit used by larger states to facilitate the payment of tribute and other relations between the rulers and the peasantry. Yves Person (1968:57-67) emphasised the difference between the ritual function of the village chief (*dugutigi*) and the political role of the head of the *kafo*. This distinction, concluded Levtzion drawing from Person, '...represents the supremacy of the territorial factor over the kinship group.' and gives the *kafo* some of the characteristics of a state (Levtzion 1973:106).

The *kafow* of Benyen at Muntugula and Mèkètan (Map 3.1) at Baginda were most often mentioned in the oral history of Soro, although I never heard anyone say that Soro was ever a part of one of these *kafow*.[5] The right bank region included many political territories. Soro itself may not be old enough to have a long association with one particular *kafo* before the French came and made *kafo* into *cantons* 'subdivisions' to collect taxes and implement colonial policy at the local level.

The origin of Mèkètan provides evidence of the strong links between the region and the Segu state. In an un-

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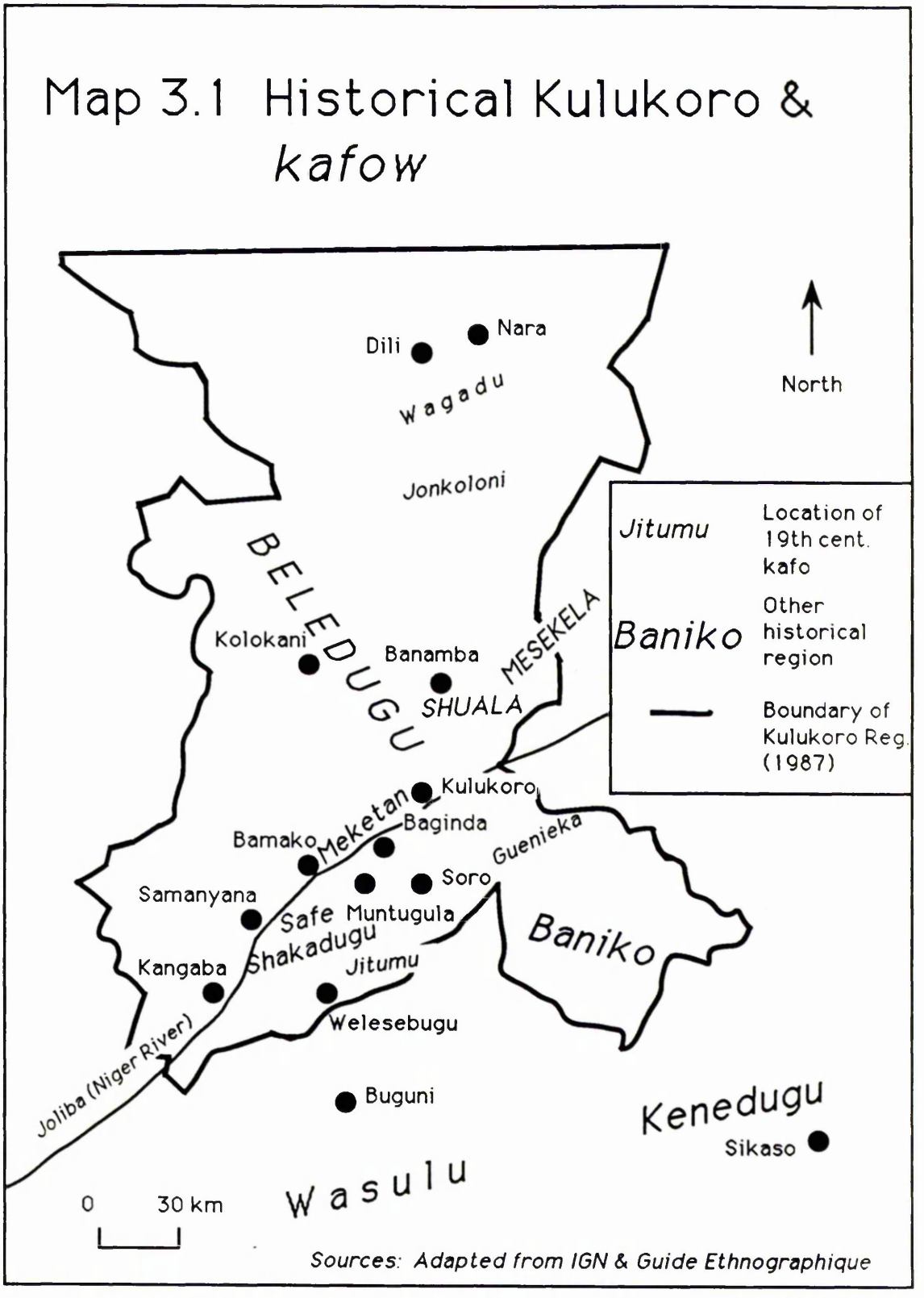
5. Safè, located southwest of Soro, was also mentioned. For more on the *kafòw* of the right bank, see Direction Régionale...Guide Ethnographique, 1986.


Map 3.1 Historical Kulukoro & kafow
Dili
Nara
Wagadu
Jonkoloni
North
BELEDUGU
MESEKELA
Kolokani
Banamba
SHUALA
Jitumu
Location of 19th cent. kafo
Baniko
Other historical region
Boundary of Kulukoro Reg. (1987)
Kulukoro
Meketan
Baginda
Bamako
Guenieka
Soro
Samanyana
Safe
Muntugula
Shakadugu
Baniko
Kangaba
Jitumu
Welesebugu
Joliba (Niger River)
Buguni
Kenedugu
Sikaso
Wasulu
0
30 km
Sources: Adapted from IGN & Guide Ethnographique

published letter (10/88), Issaka Bagayogo reported that in his interviews in Baginda in 1986 he found that Mèkètan was founded at the beginning of the nineteenth century after the conquest of Samanyana by Da Monzon, the leader of Segu (Ba 1987). Beki Jara and his younger brother Mokòrò who were among the *tònjònw* 'professional soldiers of Segu' military leaders of the campaign against Basi Jakite of Samanyana were given the *kafo* as a reward for their service. They made Baginda their capital, and expanded the *kafo* to include 12-13 villages on both sides of the river. The son of the last chief of the Baginda *canton* said that the derivation of the name Baginda stems from the name of its founder: *Beki ta kò* 'the descendants of Beki'. The etymology of Mèkètan also refers to its founder: *Beki ta na* 'Beki's place'.

During the unsettled 1880s and 1890s, the history of Muntugula is representative of the kinds of relations villages in the right bank region had with the three late nineteenth century polities--the Tukulors, the Samorians, and the French--vying for control of the Niger basin. Like other villages on the right bank, Muntugula was fiercely anti-Samorian. In 1883, rather than submitting to Samory, the Muntugula chief fled north of Bamako across the Niger River, leaving the village deserted. In 1889, the rest of the *kafo*, including the chiefs of Dara (Map 1.1) and Kobila, joined him after being deserted by the Tukulors. The people of Baginda, part of neighbouring Mèkètan *kafo*, fled to the Bamako side of the river also, immediately opposite Baginda

near Sala.[6] The right bank was thus deserted until 1895 (Person Ibid.).

Mèkètan and Muntugula were among those *kafow* that sided with the French in their opposition to Samory. Person (1968:493), drawing from the oral history of the chief of Muntugula,[7] said that the head of Mèkètan, Lahari Jara of Baginda, signed a treaty with the French 18 April 1883. He fled across the river to Sikòrò in Bamako at the foot of Point G. Bèjè Jara of Mònfa, another right bank *kafo* headed by a Jara, stayed with him until 1895 when he was the first to return to his land (Person 1968:404-5,492-3,513;1970: 1136). Others fleeing to Bamako for safety from Amadu or Samory were from the *kafow* and regions of Wasulu, Jitumu, Shakadugu, Ganan, Solon, Safè, Cèkuma, Banan, Cèdugu, and Maramandugu (Meillassoux 1963:203). Samory and Amadu came to peace in 1889, declaring that the most important enemy was the French. But this unity was too late to avert the French march on Segu, which fell to Col. Archinard's forces on 6 April 1890 (Person 1970:1098-99, 1137).

This brief account of right bank regional history in the area of Soro at the time of the Samorian, French, and Tukulor conquests demonstrates its strategic position. From

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6. In February 1884 with the support of Sala, the Baginda refugees crossed the Niger to attempt to help the people of Falani (Kélimbadugu) to flee to the right bank. They were attacked by 40 Samorian sofas whom they defeated and took prisoner (Person 1968:715).

7. Person's oral history sources from the Cercle de Bamako, right bank included: Nyèkoro Samake of Wèlèsèbugu and Cèmògò Fin Kulubali of Bugula, chief of Safe, born about 1900.

this early period in the late nineteenth century, Soro has been incorporated in various larger political configurations, including the *kafow* and later the *cantons* which I will discuss further in the next chapter. It has been distant from the rival state powers that sought to control the right bank territory. From the Soro perspective, these powers were hegemonic polities to which the chief would have to pay tribute. The state today, to which I will later return, is perceived in similar terms.

This section also shows that the present case study village, with reference to Segu history, is not that old, and that given the presence of pre-Soro ruins, the site was inhabited before the period of wars in the late nineteenth century. After discussing the role of social identity and settlement units in the next two sections, I will show that the age of the settlement is significant to land access relative to the age of neighbouring communities.

iii. Social identity: ethnicity (*siya*) and family name (*jamu*).

The family name (*jamu*) of the founder of Soro, Kulubali, is Bamana. The Bamana word *jamu* can denote clan, lineage, and simply family name.[8] Special social relations exist between members of some *jamuw*. Joking relations, for example, between certain *jamuw* called *senenkunyaw*

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8. Another term relevant to these social categories is *kole* 'lineage segment'. It is larger than the persons in a *ga* or *du*. One may speak of the *koletigi* of the Samakes, that is the head of a lineage segment of the Samake *jamu*.

are connected to legendary relations between the clans.[9] Since the founder of Soro was a Kulubali and therefore all subsequent chiefs (*dugutigiw*) are Kulubalis, the village may be referred to as a Kulubali village. In this way, Munzun also is a Kulubali village since it was founded by a Kulubali, Muntugula a Jara village, and Nkòni a Sinayogo village. In no way does this mean that the only *jamu* living in, or welcome to, the village is that of the founding lineage. In 1987 eleven lineages were represented in Soro with ten *jamuw* (Table 3.1).

Table 3.1

Arrival of Lineages at Soro[10]:
Order of Arrival, *jamu*, Approx. Date of Arrival and Origin

1. Kulubali, 1875?, originally from Segu
2. Sako, possibly from Shuala (Banamba Cercle)
3. Dumbia, 1905?, from Nioro du Sahel, originally from south of Soro
4. Jalo, from Mesekele
5. Fane
6. Samake, 1942?, left Wèlèsèbugu in Samorian era to go to Farala (east of Wèlèsèbugu), then to a village east of Soro before settling in Soro
7. Kone
8. Tarawele
9. Jalo, 1960s, from Barawele
10. Ba, 1985
11. Sinayogo, 1987, from Munzun

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9. Cf. Lewis 1979:170-1.

10. From hereafter, the 22 households of Soro will be designated by a Roman numeral that corresponds to the order of arrival of the ancestors of the current heads of households, e.g. the *dugutigi*'s household, first in Table 3.1, will be designated by a I. Lineage segments are in the order of descendance, thus Household II is a part of the same lineage as the *dugutigi*. See Appendix F for a complete explanation of the coding of farm production units.

Among these *jamu*, both Bamana and FulBe[11] ethnic groups are represented. Ethnicity (*siya*) and culture are simultaneously central to one's identity and often difficult to pin down with a precise definition that is valid among a variety of people. Different identities are valid in different settings, both in time and in space. One's culturally determined identities--whether ethnic, village, *jamu*, religious, occupation--may or may not be significant in a particular context. Much has been written elsewhere about *bamanaya* 'the state, condition, or characteristic of being Bamana' (cf. Bazin 1985; Lewis 1979:87-110).

In Soro, the two most recently arrived FulBe families were bilingual, speaking both Pular and Bamana. The first FulBe family to settle in Soro--number four in Table 3.1--spoke only Bamana and the wives of the married men all had Bamana *jamuw*. One of the Jalo daughters was married to a Kulubali.[12] This first Jalo family is said to have come to herd the cattle of the chief. The FulBe are especially known for cattle rearing just as the Bamana are known for farming, but this general image does not suggest an exclusive ethnic - occupation association. All of the FulBe families in Soro farmed, and some of the Bamana families owned and raised cattle. Culturally and in the terms used

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11. The FulBe are often called Fulani in English and Peul in French. They call themselves FulBe. The Bamana call them *fula*. The language is Pular.

12. When marriage takes place, both wife and husband maintain their respective *jamuw*. Their children take the *jamu* of their father.

by people in the region, the village is a Bamana village since the chief is Bamana, the main public language is Bamana, and the dominant cultural terms of reference are Bamana.

Other social categories include the historically significant social divisions of free person (*hòròn*), casted (*nyamakala*), and slave (*jòn*). Slavery has been abolished in Malian society. In Soro, the Dumbia family (no. three in Table 3.1) head still remembered some Maraka[13] language from his childhood when he and his family were slaves of Maraka farmers in Nioro. They had been captured during a war south of Soro, probably in Jitumu or Wasulu, and sold to Mauritania. Later, they were sold by Moors (*surakaw*) to Nioro. Today, they are free and make reference to their pre-enslavement status as free persons.[14]

All of the families in Soro are *hòròn* except Fane (no. five in Table 3.1), the one *nyamakala jamu*. The Mande castes include *numuw* 'workers of metal, wood, and clay' and *jeliw* 'bards (*griots*)'. Today the meanings of these categories are changing. No men in the Soro Fane family work metal or wood and no women make pots. They are farmers. Still, it was common to hear residents of the village refer to '*numu* Fane'. Active metal working *numuw* were in neighbouring villages. In the village near Wèlèsèbugu, there

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13. Maraka are called Soninké or Sarakolé in French.

14. From Mèkètan to Wasulu and in Manden, many Dumbias have historically been *bula* 'blacksmith' and casted. The Dumbias of Soro may, thus, have had a casted past before enslavement (letter from Mara 1988).

were metal workers in a Dumbia family but they were not considered *numu*. It is inaccurate to place a strict occupation definition on the *nyamakalaw*. The history of *nyamakalaw* and their roles in Bamana beliefs has been explored elsewhere (cf. Frank 1987; Johnson 1986:22-29; Conrad 1981:69).

iv. Village settlement units: hamlet (*buguda*), quarter (*sokala*), and house (*so*).

People who identify with each other have tended to settle together. Whether identifying a common ancestor, a common religion, a common ethnicity or language, or a common social status, examples abound of clusters of houses belonging to groups sharing a way of life. Where and how villages are organised in space is, thus, a reflection of village history, as well as environmental factors (Turrittin 1987: 87-9; Gallais 1967, 1960). In addition, as I will show here and in the next section, village spatial organisation also reflects farming, the primary productive activity.

In most cases, the houses are organised as patrilocal compounds, often housing extended families. These residential units have corresponding labour and production units which will be discussed in Chapter V, although residential and production units are not always equivalent. Of the three units discussed here, the *so* 'house' is the most basic. The other two units cannot exist without houses as component parts. The *du* 'compound, house, household' and *ga* 'hearth, household', discussed in Chapter V, are closely related terms. The intricacies of the specific meanings of

so, *du*, and *ga* depend very much on the context in which they are used. Here, I am using *so* as the physical building and to mean one's living place as connoted in the expression *n'bè taa so* which translates to 'I'm going home.' English translations of room, house, or compound do not lend themselves to a clear understanding of the architectural structure of a Bamana house.

In Figure 3.1, I have outlined a Soro compound (Household II, see Appendix F) to show the relation between house structure and social structure. The granaries opposite the household head's room are filled with the product of the household field (*forobaforo*). Each of the able-bodied adults with rooms (designated S1, W1, etc.) worked in the household field in 1987 except the herder and the two wives of the head of the household.[15] The room of each married man in the family faces a courtyard which is surrounded by the rooms of his wives, a kitchen (*ga*), and a toilet/bathroom (*nyègèn*). The work area used by women for grain pounding, wood cutting, and shea (Butryospermum parkii) roasting (Ch. VI) is located outside the compound walls beneath intertwined baobab (Adansonia digitata) and tamarind (Tamarindus indica) trees. Also beyond the compound walls, women dump the rubbish and loose dirt (*nyaman* or *sununkun*) swept from the courtyards.

Some villages are marked by spatially and architecturally distinct quarters or wards (*sokalaw*). The village

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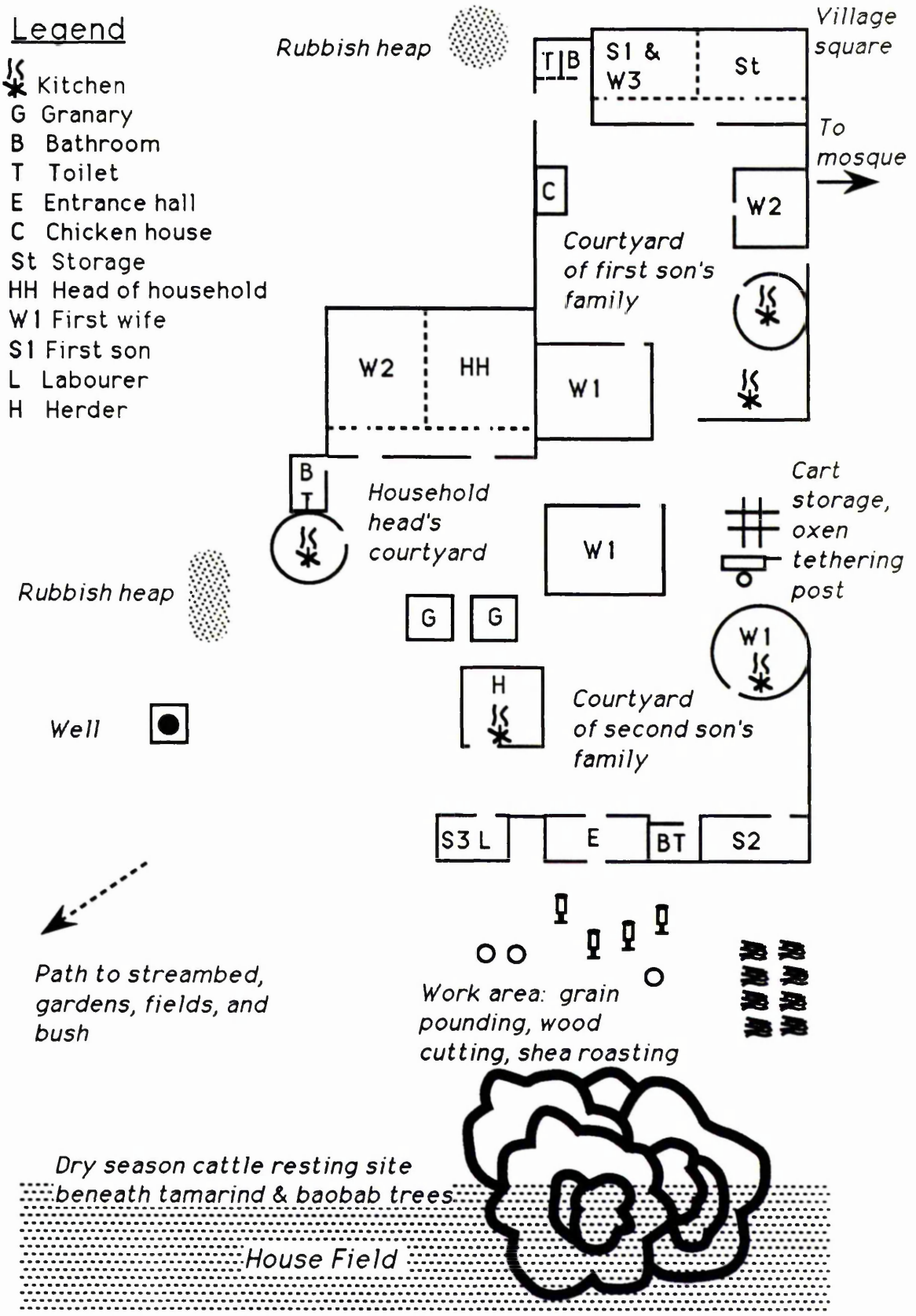
15. The relationship between field types and farmers will be discussed further in Chapter V.

Fig. 3.1 Compound Diagram



Source: Fieldwork, 1987

near Wèlèsèbugu had two such quarters separated by several hundred metres where institutions not related to the historical Bamana practices were located: the dispensary and school, plus their employees; the cemetary, village collective field, and a number of house fields also occupied this space. Each quarter had its own mosque and public place (*fèrè*), as well as separate social institutions, showing some of the characteristics of separate villages. They were, however, united under the same chief.

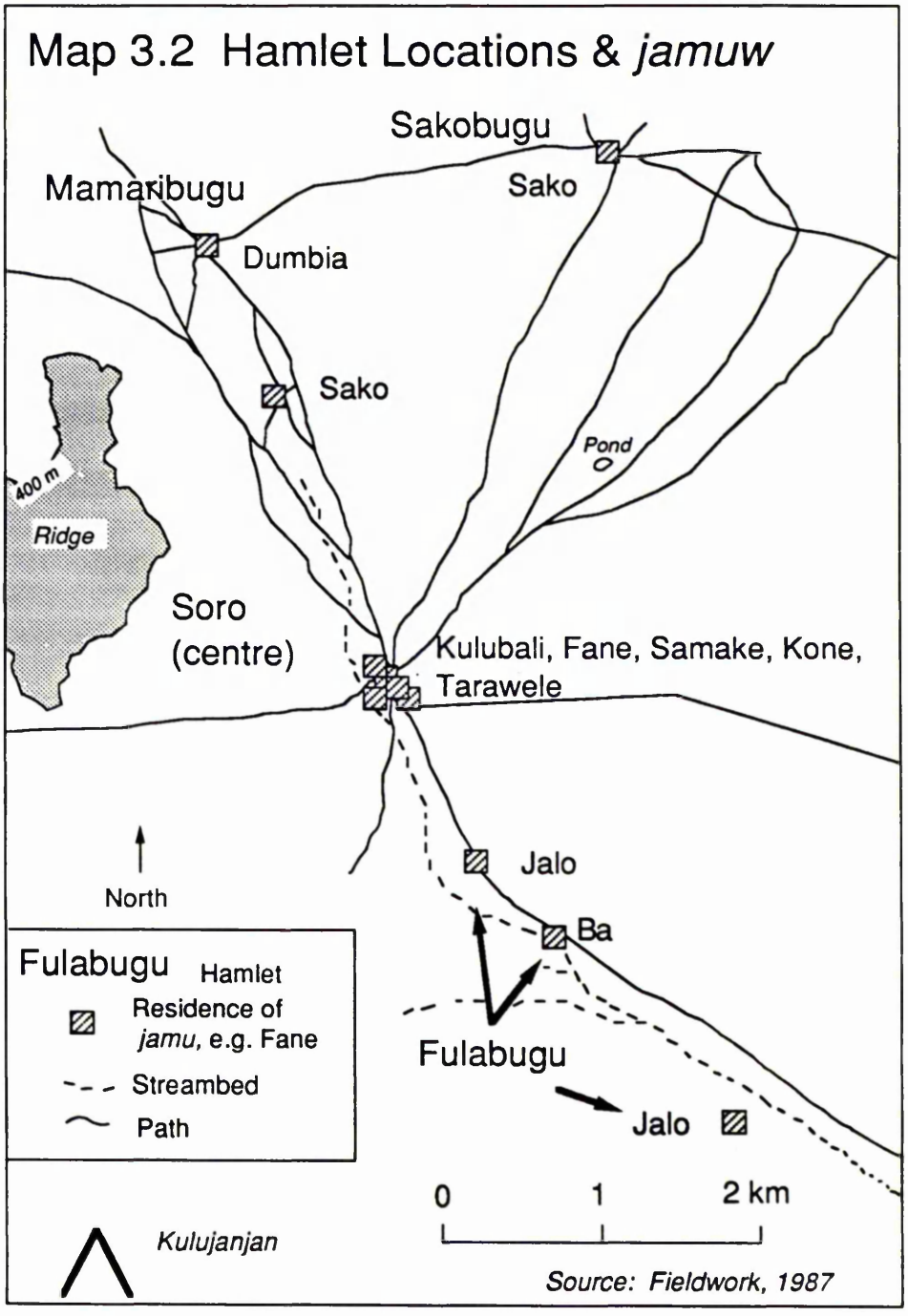
In Katiali, a Dyula and Senufo village in northern Côte d'Ivoire, Bassett found that quarters corresponded to *kabila* 'people of the same *jamu* and their dependants'. They also were a unit of production composed of *duw* (Bassett 1985:35-9). This pattern of residential clustering by *jamu* is a common reason for village quarters throughout West Africa (Akasaka 1973; Brasseur 1968). After the original settlement of the village by the founding family, others come later. They build their houses in a separate location within the village and a new quarter begins.

At Soro, separate hamlets or satellite settlements (*bugudaw*) have been more important in terms of spatial organisation than village quarters. While the *kabila* makes reference to relation by common descent, the *buguda* is a farming hamlet, often where family members live for the growing season to avoid a long walk to and from their permanent dwelling site in the village centre. Although the *buguda* may at origin be a farming hamlet, it can become a permanent dwelling site and thus make even relatively small

villages such as Soro dispersed over 15 km² or more (Map 3.2).

Soro has three main *bugudaw* today: Fulabugu spread over 1.5 - 2.5 km to the south, Sakobugu 4.5 km to the northeast, and Mamaribugu 3.0 km to the north. The residents of these hamlets are historically part of Soro village, work Soro land, recognise the Soro *dugutigi* as their chief, and pay taxes as part of Soro. The most obvious difference between them and the residents of the centre of Soro is distance. Still, that spatial difference is significant --Sakobugu is closer to Nkòniko and its residents participate in Nkòniko social activities such as holiday prayers and in joint economic enterprises such as labour groups; Mamaribugu, with a population of over 25% of that of Soro centre resembles a small village with narrow pathways between houses and multiple trails radiating out of the centre; and, Fulabugu is just that, *fula* 'FulBe', *bugu* 'settlement', a dispersed hamlet inhabited by Soro's three FulBe families.

The village has not always been structured this way. The Sako family members of Sakobugu still remember where their residence in Soro centre was, and the elders still remember the site the Dumbia family left to form Mamaribugu. Two of the FulBe households are relative newcomers and settled first in the *buguda*, while the other two, part of the same lineage, originally settled outside the centre as the chief's cattleherders (Table 3.2). Soro has had other hamlets which have been vacated, some by people who left the


Map 3.2 Hamlet Locations & *jamuw*
Sakobugu
Sako
Mamaribugu
Dumbia
Sako
Pond
400 m
Ridge
Soro
(centre)
Kulubali, Fane, Samake, Kone,
Tarawele
North
Jalo
Ba
Fulabugu Hamlet
Residence of
jamu, e.g. Fane
Streambed
Path
Fulabugu
Jalo
0
1
2 km
Kulujanjan
Source: Fieldwork, 1987

village entirely and others by those who came into the centre. The whole picture is thus one of population movement and dispersal over a large village territory.

Table 3.2

Sattelite Settlement (*buguda*) Formation, Soro.

Hamlet Name	Location	Established	Population
Fulabugu	Spread along *kò* in three locations to south of centre	First in 1910-1920; second, 1960s; third, 1985.	57
Mamaribugu	2 km north of centre	Late 1920s, at the time of the building of the Baginda canal	60-70
Sakobugu	3.5 km NE of centre	1930s-1940s	35

Soro residents explained that the reason for the existence of hamlets is simply that the distance required to walk out of the centre to fields is too tiring to traverse every day during the agricultural season. At some point the decision was made to move the residence site to the fields, eliminating the tiring and time-consuming walk everyday. This explanation is logical and corresponds with part of Chisholm's (1979) discussion of satellite settlement origin. Increased population density and use of soils close to the central settlement also may contribute to the dispersal of settlement sites.[16]

In the Bamana context, hamlet formation seems to follow the history and current practice in Bamana agriculture of

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16. General Toutée came to this conclusion from observations of Sonraï villages in eastern Mali (1914:122).

having a seasonal residence adjacent to the fields. Seasonal hamlets built for wet season only with the residents returning to their permanent central village house at the end of the agricultural season clearly cut down travel time and make it easier to guard the fields against predators. Soro fields are not as far away as those described elsewhere (cf. Brasseur, 1968, Sikaso region) and such seasonal hamlets do not exist, although erecting a shelter (*togo*) in a distant field is practised.

Another reason households leave the centre to establish hamlets are conflicts with neighbours. Just as disputes lead to fragmented lineages which ultimately have a spatial expression in separate residences, so households sometimes relocate within the village territory but away from other families. Sometimes the dispute is long forgotten and the participants are no longer part of the lineage, but sometimes the dispute is passed on through generations. In either case, it is unlikely that village residents would want to mention disputes as a cause of hamlet formation.

v. Implications of settlement history.

Without introducing a typology, Lewis (1979:98-100) has made a distinction between 'Bamana' villages and *tònjòn*-founded villages. Drawing from his fieldwork south of Segu, Lewis has distinguished the former as older, more egalitarian, and focusing their agricultural production techniques and goals on subsistence in order to reproduce the descent lines. In contrast, Lewis argues, *tònjòn* villages are

newer, founded by the 'slaves of the state' interested in securing personal benefits. As a model, the *tònjòn* villages are more ephemeral because they do not depend on the maintenance of descent lines for their unity and longevity, but rather on continuing to produce surpluses from their component parts. These villages are distinguishable by the preponderance of *jònforow* (*jòn* 'slave', *foro* 'field'):

> ...not only because these were the only sort of fields slaves were permitted to manage but also because a concentration on fleeting, private production so often led to a dependence upon non-kin persons and structures if not slavery itself. (Ibid:99)

The difference, as presented by Lewis, is between villages where a moral economy is prevalent and villages where it has been penetrated by a market orientation. In the moral economy of 'Bamana' villages, Bamana patriarchs focus on the production of grains in order to reproduce the lineage. In the *tònjòn* villages, production is the prime goal, with individual units oriented towards commercial ends.

Today, Lewis adds, the label '*tònjòndugu*' applies to relatively new settlements founded by persons who are far from their descent lines, and thus are strangers in the area. Applying this model, derived from a region influenced by the Segu state, in conjunction with the oral history data I collected, Soro and Munzun are original *tònjònduguw*, founded by Kulubali *tònjònw* in the nineteenth century. Baginda and the adjacent Mèkètan *kafò* were also started by *tònjònw*. Without further investigation of the origins of other villages on the right bank such as Dara and Muntugula

considered old by Soro residents, it would not be possible to identify what Lewis has called '*bamana duguw*' in the area.

Soro and Munzun are, however, self-proclaimed 'old' villages in the area. The neighbouring villages of Tangala and Nkòniko were hardly considered villages by some people in Soro. As I will show in Chapter V, this somewhat disparaging view of certain newer villages is because they were founded after Soro on land either claimed by Soro or other older villages. I found evidence in Soro to support Lewis's concept of crops and descendants as 'twin poles of production', which suggests that the village has at least some of the orientation of a *bamana dugu*. Within the village, as I have shown, immigration has been a feature over the last century. New lineages have become established and have gained an interest in producing descendants. Lineages are reproducing, and the individuals who comprise them change. I would thus add a temporal dimension to Lewis's model. With time, villages can, or could, take on more of the characteristics of a *bamana dugu*.

In Soro, the new settlers, notably Household XXI, are indeed cut-off from their lineages, are not ethnically Bamana, and depend on commodity production to make ends meet. But, in Mali today, communication is relatively rapid and support can come from distant relatives without their physical presence. Relatives in the wage-earning sector of Bamako can periodically send remittances to Soro households, thus changing the kind of community and kin reliance em-

braced by the concept of a *bamana dugu*. Such remittances can support household budgets, as Lewis himself shows (Van Western and Klute 1986, Lewis 1985, Mazur 1984). They can also potentially undermine the complex and tightly knit social relationships that bind together *bamana duguw*, making them more dependent on the sale of labour or of agricultural produce. This is part of the 'reproduction squeeze' and the commoditisation of labour (Bernstein 1979).

Certainly not all Bamana villages are the same, nor are all their residents necessarily ethnically Bamana. The middle and upper Niger region with which this study is concerned is culturally rich. Regional marketplaces invariably had traders from many backgrounds. In the case of the single village of Soro, residents included Bozo, Maraka, Dogon, and FulBe, as well as Bamana. For this reason, Richards with Mabogunje (1985) argues for a 'synchronic' approach to spatial organisation to grasp the prevalence of ethnic groups 'sharing' the same territory. In a similar way, the dynamics of a village's farming system are a part of broader regional and national agrarian change (Richards 1984:557).

With this approach, Bamana village spatial organisation is but <u>one</u> geographical phenomenon in a region of rich cultural and ethnic 'overlap'.[17] The model of synchronic spatial organisation can be expanded to explain the simul-

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17. See E. Scott (1979) on FulBe herders' use of one ecological niche adjacent to farmers of other ethnic groups; <u>Etudes Maliennes</u> (1980) issue is devoted to Bozo and Somono fishing peoples; Amselle (1978) on Koroko traders--for occupation specialisation by ethnic group.

taneous use of space by different groups exploiting different resources. A herder's dry season pasture may be a farmer's rainy season field. This is the case in Soro as elsewhere in savanna dry land farming systems. Although an 'isolated' village with its fields and bush land is the centre of a local cultural system, it, too, is simultaneously a part of broader systems of spatial organisation. What constitutes a village land resource in a local organisation of space might also be a national land resource. These aspects of 'shared territory', including adjacent religious institutions and conflicting land use interests, have historical backgrounds.

2. Spatial Concepts.

I have just shown how farmers have settled in an area, occupying the land in a pattern linked to ethnicity and lineage. How has the utilisation of that land linked the location of agriculture with other cultural uses of land? The ordering of space at the village level reflects the Bamana worldview.[18] Agriculture is the chief enterprise of the village economy, and the location of fields is an important part of the Bamana view of the world. Fields have a special place in the Bamana worldview that is complemented by that of noncultivated bush, and the inhabited village. This view of agricultural space emphasises its complemen-

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18. I use 'worldview' following Yi-Fu Tuan (1974) to denote a people's perception of the environment and the consequences for the ordering and conceptualisation of space.

tarity with other zones. In this section, I introduce two ways to understand Bamana village spatial organisation: through the invisible, metaphysical, belief system and through the visible, physical layout and economic use of village land.

i. Sacred space and three spatial concepts: *kungo, foro, dugu.*

Landscape evolution and conception as shaped by belief has been the subject of much work by social scientists in other parts of the world, but little in West Africa.[19] Bamana religion has been the subject of considerable social study, especially earlier in this century (Zahan 1974, 1960; Cissé 1964; Pâques 1954; Dieterlen 1951; Ganay 1946; Tauxier 1927; Henry 1910), and more recently in the context of art history (e.g. Ezra 1986). Here, I shall highlight some important elements of the land use related to agriculture that are a direct result of belief, rather than production as isolated from other meanings associated with land. In Soro, two different dimensions of sacred space can be identified: 1) three broad concepts or elements of sacred space, and 2)

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19. The Marcel Griaule school of anthropology is a notable exception. Griaule and his followers--Germaine Dieterlan, Dominique Zahan, Viviana Pâques, Genevieve Calame, Solange de Ganay--have been especially concerned with cosmology. Griaule's work on the Dogon is especially well known and is often cited in works on the relationship between belief and spatial organisation (e.g. Sopher's Geography of Religions and Eliade's The Sacred and the Profane). William Jones (1976:315) describes the Griaule school's *modus operandi* as determining the cosmic myth of a people through ethnographic study, and from the myth explain the practices of everyday life.

specific sites--a sacred tree or grove.

Broadly speaking, space can be divided into three concepts or elements (Fig. 3.2)[20]: *foro* 'field' as closed, demarcated space, closely guarded by farmers' vigil against animal predators; in opposition, *kungo* or *wula* as open, synergetic space inhabited by spirits (*jinèw*); and *dugu* plus its adjacent *nakòw* 'gardens' within the boundary of inhabited space, which in some places in the past was defined by a *tata* 'fortified wall' (cf. Brasseur 1968) At the intersection of the paths from each of these three elements, sacrifices are made either by families (a few kola nuts) or the village collectively by the representative of the village chief. This site is the *dankun*[21].

In the supernatural world, the bush plays a major role:

> The bush is represented as the property of invisible forces: *jinèw*. These forces duplicate the human universe and communicate with it; their society is conceived of as analogous to human society--the *jinèw* are hunters, magicians, healers, and they live in sacred places (trees, streams, hills, termitaria...).... The *jinèw* can take a human form, but their existence is known only to the great hunters. (Thoyer-Rozat 1978:20)

The safety of one's mother's house in the village is contrasted with the danger of the bush (Johnson 1986:11). Hunters (*donsow*) are a social group renowned for its know-

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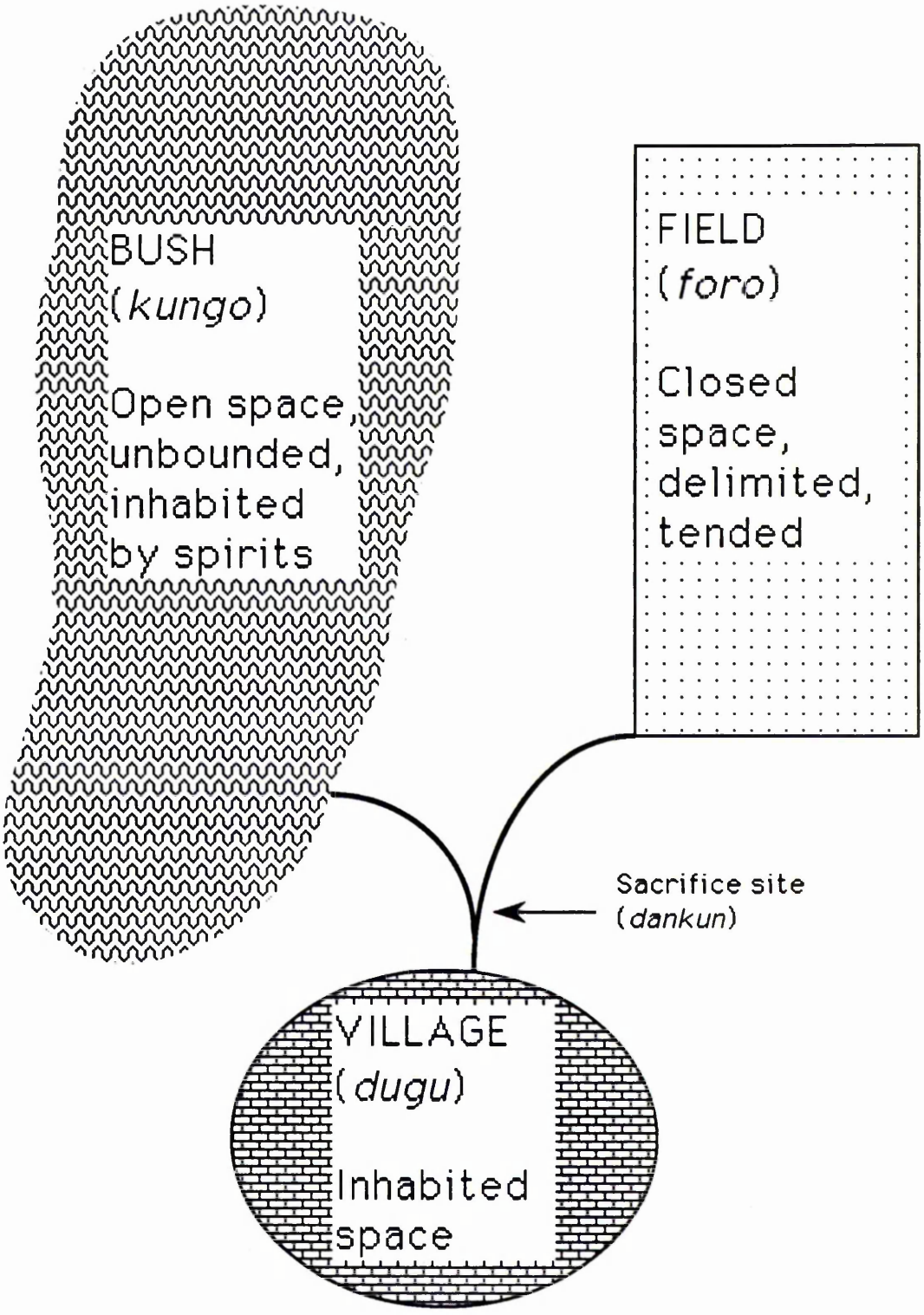
20. This diagram is an elaboration of one presented by Issaka Bagayogo at the School of Oriental and African Studies, London in March 1988.

21. *dan* means boundary but according to Bagayogo is derived from a word synonymous with *kungo* and *wula*; *kun* means head. Thus, *dankun* is the head of the bush. A *dankun* was present at Munsun and the village near Wèlèsèbugu.

Fig. 3.2 Three Spatial Concepts



ledge of the occult and consequently the plants and animals of the wildlands. If the bush is considered dangerous by villagers, it is productive to hunters (Jara 1978: 19-20). Elder men in the village near Wèlèsèbugu as well as in Soro frequently recounted incredible feats of hunters, such as one told in Soro of an elderly hunter who made the 45 km to Bamako on foot faster than four young men on bicycles. Hunters' songs are very popular and reveal some of the mystique of their occult power (Jara 1978).

The spirits (*jinèw*) which inhabit part of the sacred space of the Bamana world are the key to the dangers. Hunters and herbalists--who are farmers--are skilled at controlling these spirits.[22] The conceptual peace and order of the village in opposition to the chaotic wilderness of the bush is a common theme in other parts of the world (Tuan 1978:87, Eliade 1957:29-32).

The objects that these spirits inhabit constitute what Eliade (1957:11) calls a 'hierophany', meaning 'something sacred shows itself to us'. Hierophanies can have a profound impact on spatial organisation (Sopher 1967:47-78). In the study village, three prominent sacred places stand out: the mosque and its outdoor praying site for holidays, the *kòmòtu* 'grove of the *kòmò*[23] fetish', and the *dugudasiri*

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22. The *doma* is a healer and an herbalist. She or he is one kind of Bamana healer among many. Bagayogo (1988 oral communication) lists: *furabola* 'herbalist', *flèikèla* 'healer', *doma*, *soma* 'fetishist', *suba* and *nyègan* 'sorcerer and anti-sorcerer', and *maadona* 'interpreter of symbols'.

23. The *kòmò* is one of several Bamana initiation societies that have an important religious role.

'home of the protecting spirits of the village'. The *ka-burudo* 'cemetery' is also sacred village space, demarcated by the stand of mature *nyamamuso* (Piliostigma thonningii) and *nyamacè* (P. reticulatum).

About 200 metres east of the chief's house stands a large *nsèrèbilen* (Ficus glumosa) with branches dipping to touch the ground in a wide ring around the stout trunk. It is the 'residence' of the *dugudasiri*[24] where the village founders protected spirits residing in it that they believed would benefit the village through time.[25] The *dasiri* can occupy many different geographical features besides trees.[26] Historically, the chief has a special relationship with the *dasiri* of his village, since he is the eldest direct male descendant of the founder of the village who first benefited from the protection offered by the *dasiri*. Village founders seek the authorisation and protection of the spirits of the place as a precondition for establishing a village (Lem 1948:550). Zahan (1974:11-13) refers to the *dugudasiri* as the *axis mundi* in Bamana cosmology. Today in Soro, it is

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24. Lem (1948) has mistakenly reversed the word *dugudasiri* to *dasiridugu*. The hierophany of a tree or a grove of trees is due to the presence of the *jinès*. The tree itself is not sacred outside of its function as a shelter for the spirits (Eliade, 1957:12). See Zahan (1974:11-13) and Imperato (1977:32-33) for other views of the *dasiri*.

25. Lem (1948) reported that belief in what he called the 'tree cult' was widespread in the Mande zone, and analogous to the Romans' *lucus* (L. 'grove') and the sacred groves of Mediterranean cultures.

26. Lem lists a sample of other *dugudasiri* objects, including: *jiri* 'tree', *dala* 'pond', *kolon* 'well', *kòba* 'stream', *kulu* 'hill', *tu* 'wood, grove', *kaba jògòn* 'rock pile', *ntonkun* 'termite mound', and *fala* 'valley (Lem, 1948:544).

forbidden to cut the *nsèrèbilen* which stands in full, spreading splendour in the chief's house field.

The *kòmòtu* 'place of the *kòmò* fetish' of Soro is a true sacred grove. Soro's *dugudasiri* is a single tree. Historically inhabited by the *kòmò*, one of the six major initiation societies at the heart of Bamana culture,[27] this sacred grove is an approximately 60 x 40 metres parcel currently surrounded by the fields of the chief's younger brother and one of his wives. It is a dense growth of large tree species, including *jala* (Khaya senegalensis), *nèrè* (Parkia biglobosa), several specimens of the common *nyama* with thick trunks and over 10 m high that are rarely found elsewhere in their mature form, lianas, and diverse herbaceous growth during the rainy season.

Although the *kòmò* is said to have 'left' the village around the time the current chief came to power as a Muslim in 1968, the grove is still not cut despite the heavy firewood collection of the area. The sacred grove of Soro is a cultural artifact in the landscape, a place the sacredness of which has ostensibly disappeared with the practice of Islam. Young children play in it, but others seem to keep their distance as in the past when only *kòmò* initiates were allowed in. Elsewhere in Mali, such sacred places have become the sites of mosques such that one religion joins or displaces an earlier one but the sacredness of the site endures (cf. Sopher 1967:50). The neighbouring village of

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27. See Ezra (1986:13-15), Zahan (1960), and Dieterlan (1951) for more details on *kòmò*.

Munzun maintains a *kòmò*, but the trend toward abandonment of Bamana religion continues as villages increasingly embrace Islam.

The mosque itself is the chief permanent Islamic sacred space. Its orientation toward Mecca testifies to the broader universe of Islamic belief. While Islam has been in the territory now called Mali since the tenth century A.D. (Trimingham 1962:20-33), by no means did it immediately replace the existing belief systems. In fact, the early nineteenth century Islamic theocratic polity of Hamdallaye had to take an accomodating stance with the neighbouring Segu Bamana polity which worshipped in the Bamana tradition. Perinbam (1986) notes the nineteenth century mixing of Islam and Bamana belief in the Beledugu area north and east of Soro.

The twentieth century has been marked by a peaceful spread of Islam both in the urban centres and in the countryside. The compounds of Soro's two Qur'anic teachers (*moriw*), each of whom has made the hajj to Islam's most sacred place, Mecca, are auxiliary to the mosque, at least for the students who daily practice their verses in Arabic there. Each night during the dry season, one of the *moriw* teaches in the light of a large fire that illuminates not only the outdoor classroom, but also the trunk of the towering date palm planted there that can only add to the image of the Islamic holy land on the Arabian Peninsula.

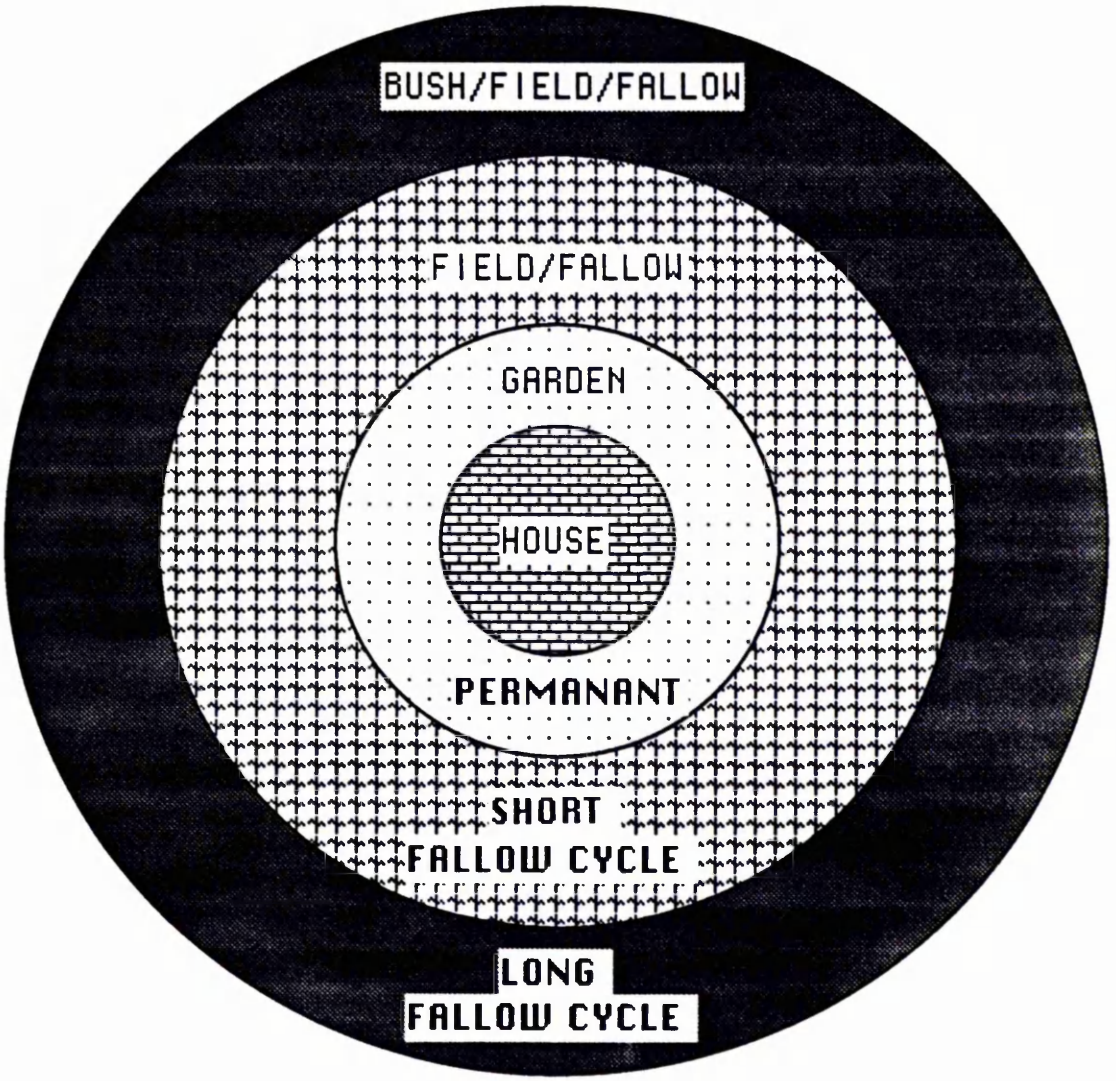
ii. Village land use as concentric zones.

Isolating the economic geography of village land from local concepts and meaning of land (an ecology-based Bamana land classification will be presented in Ch. VI), the technical constraints on production can be emphasised. A model of West African village spatial organisation inspired by von Thünen's theory of farming land use postulates zones in concentric circles around the compound living area (e.g. Morgan 1969). In this model, the enclosed compound living space lies at the centre. Moving outwards, it is bordered by village public space, followed by house fields which are fertilised with organic refuse, then a patchwork of fallow and cultivated fields, and further still, the communal woodland or bush (Figure 3.3).

The rings appear to imitate von Thünen's 'isolated state' model (see Horvath 1969). Von Thünen's model of increasing intensification towards the centre is, however, based solely on an economic rationale and even then oversimplifies production relationships (Morgan 1973). The West African village model of land use rings centred on the settlement site is based primarily on reasonable walking distance out to the fields (Brasseur 1968:53).

In this pragmatic view, agricultural land begins with the kitchen gardens (*nakòw*) where condiments are grown adjacent to the houses or located in lowland soil. Beyond the gardens, the fields begin. Here, fallow fields (*foro manyanw*) alternate with active, cleared fields. The uncultivated land, bush, or woodland (*kungo*) is, schematically,

Fig. 3.3 Farming Zones As Concentric Circles



beyond the fields. As a fallow field goes through successive stages of grass, shrub sprouts, and tree seedlings, it is returning to bush. The field is cleared from the bush and when abandoned in the fallow-cultivation cycle becomes bush again. The outer ring of fields, from 0.5 km - 4 km out from the centre in the study village, intermingles with nonarable and fallow areas.[28] It is possible to leave a field and enter forest in one step. As seen in aerial photographs, this bush - field zone has a history of past cultivation which suggests that it is fallow field land. Fallow fields, or bush, have their own cultural and economic significance.

In terms of the significance of spatial conception, a 0.25 - 0.50 ha *nakò* 'garden', while 'field' size, is not considered a *foro* 'field'. In parts of Mali, and especially in the Arrondissement of Baginda, market garden fruit and vegetable production is a major peasant cash earning activity, and as a consequence *nakò* plots have grown in size so that in terms of area they are hard to distinguish from fields. Nevertheless, they continue to be called *nakòw*.

In Soro, fences help to define the *nakò* in spatial terms. Farmers refer to going *jesa kònò* 'inside the fence' which is synonymous with going to their *nakò*. They do not say that they are going to their *foro*, even if the plot is unfenced and a quarter of a hectare, when they are going to

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28. Brasseur (1968:53) records the outer ring of fields at 3-5 km, up to 7 km. He was drawing from fieldwork in an area south of Soro, between Buguni and Sikaso.

a plot where they 1) grow saleable fruits and vegetables, and 2) have a well to water crops during the dry season. For a plot to be a field (*foro*), a plot must have a dryland grain or pulse crop. Cotton (*kòori*) is also grown in a *foro*. This chief distinction, as it appears today in Soro, is less spatial than determined by the crop grown in the parcel. As more tomatoes are grown in unfenced dryland fields, the term *tamati foro* 'tomato field' will be hard to avoid. Fruit and vegetable commodity production in gardens will be analysed in detail in Chapter VIII.

A variation on the concentric circle model emphasises human transformation of the land. Brasseur's (1968:40) perspective of village space in West African savanna situates it within a broad ecological zone increasingly modified by human activity toward village hubs:

> The savanna which seems to result from an anthropogenic degradation of the forest [which] is inlaid, here and there, by often wide openings created by the fields and subsequent fallows.

In other words, even the base forest is a human artifact. The imprint of the bush - field land results from a greater cultural modification of land. Brasseur's view is of village space within the surrounding savanna woodland as a clearing that functions as the focal point of spatial organisation. It is the opening in the bush, where the roads and trails come together;

> ...the houses appear suddenly with all the appearance of something durable, that quality emphasised by the presence of several old trees or by mounds of ruins, the only vestige of the preceding

generations.

Brasseur emphasises the ephemeral nature of the human imprint, which becomes more permanent closer to the village centre.

Indeed, the aspect of Soro is one of cultural landscape par excellence: the *ntamaro* 'date palm (Phoenix dactylifera)' towering over the houses of the quarter inhabited by the Qur'anic teachers and the imam, a gnarled *sira* 'baobab, (Adansonia digitata)' and *ntomi* 'tamarind, (Tamarindus indica)' intertwined at the edge of the founding family's compound, numerous baobabs in a nearby site once inhabited by Soro families, and two *balansanw* (Acacia albida) specimens native to the drier savanna of the Segu area from which the original Soro residents are said to have come.[29]

Conclusion.

This chapter has shown how the setting for farmers' agricultural activities results from farmers' adaptations to the land and the modification of the land by farmers. An individual village is likely to have particular spatial characteristics, such as the location and existence of quarters or permanently settled hamlets, which have been determined by specific historical changes.

The first section showed how the social structure of the village is very closely tied to its spatial organisation. The residential quartering links lineage with loca-

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29. Some of the older residents remember when five *balansanw* stood in the village.

tion. The movement of persons into the village over the last century has been a continuing process of settlement, with those farmers adapting to local conditions. Significant differences occur between villages considering themselves Bamana or predominantly Bamana influenced. However, elements of a common spatial structure form part of the heritage of the thousands of Bamana communities. The patterns existing between social structure and spatial organisation establish the basis for examining the different kinds of productive activities carried out by separate labour groups in distinct locations.

In the second section, I introduced three Bamana terms denoting spatial concepts or elements--*dugu* 'village', *foro* 'field', and *kungo* 'bush'--emphasising the complementarity of these zones within a system of opposites. The opposition of order in the village contrasts with the chaos of the bush. Bamana culture treats the village/order - bush/chaos opposition as a paradox, to be mastered only by a few specialists. The bush (*kungo*) is wild and dangerous, but the hunter or herbalist who understands it derives power from its plants and animals, including medicines which heal the sick. The bush is the furthest land use zone from the village centre. In contrast to this distant area of disorder is the centre of the village, with sacred sites, as well as the concentration of habitation and social exchange.

The fields (*forow*) and gardens (*nakòw*) where agricultural production takes place are integral parts of this spatial organisation. They are the material base for farmers'

agricultural production and the socially defined spatial units worked by agricultural labour groups. In this way fields are an areal expression of society similar to architectural and settlement patterns. At the mid-way point in the spatial scheme between village (*dugu*) and bush, the field is an extension of the village: created by farmers, the source of the staple foods, worked by socially defined labour groups. The field has ties, especially ecological relationships, to the bush as well, which will be discussed in Chapter VI.

Fields and gardens occupy distinct rings in the concentric circle model of village space. However, in the case study village, access to water resources well beyond village bush land and into neighbouring villages plays a determining role in dry season gardening location (See Ch. VIII). The state rural development programme seeks to utilise the existing village social and spatial structure to increase national agricultural production, notably of commodities. The Bamana organisation of space, though, did not develop with this goal. The village - field - bush relationship has been a village-centred spatial pattern which developed when the moral economy united the village.

When the state and market put pressure on peasants to invert this relationship to an outward orientation, the consequences are likely be felt at the household and village levels. These changes are behind the reordering of rural space. In Ch VIII, I will show that the trips to Kanògòla south of Soro by tomato farmers are a manifestation of a new

outward market orientation: increased importance in commodity production and capitalising on an ecological niche that best provides the means of production. The wood harvesting from the bush and sales to Bamako wood traders, as I will show in Ch VI, result in a production function for the forest and commodity production by women. In this way, the social, economic, and political context of peasant farming is rapidly changing, and at least some peasants are themselves reorganising local environments to use land to gain cash income.

In the next chapter I will show how the state has intervened in the peasant economy, promoting cash crops during the twentieth century, and disrupting the complementarity of the farming system's spatial organisation.

Chapter IV.

The State and the Village-Oriented Farming System in the Twentieth Century.

In this chapter, I will outline the historical development of two strands of state-peasantry relations that have shaped contemporary Malian agriculture. The objectives, methods, and implementation of colonial agricultural policies, followed by their successors under governments of the Republic of Mali, provide the basic evidence to show the divergent interests of the state and the peasantry. The peasantry and the state have a history of relations in the middle Niger that dates to early state formation at the beginning of this millenium, but in the twentieth century they were revolutionised by the growth of the world economy. The fact that the French were the state rulers during the first half of the twentieth century gave the ideology and implementation of policy a peculiarly French cultural influence. The theme of this chapter is, therefore, the characteristics of state rule under the French, and subsequently under the two independent regimes of the Republic of Mali as they relate to the peasantry.

The subject is far too vast for a thorough analysis here. I will concentrate on the local Baginda area, where in the late 1920s and early 1930s the colonial state experimented with the introduction of a new organisation of peasant agriculture. With the Baginda irrigation project, I will argue, the state was attempting to increase commodity production and the monetisation of the peasant economy. Ef-

forts in this direction had been made much earlier with the levying of head taxes at the turn of the century and the promotion of groundnut growing. With this earlier approach, the colonial state's involvement in peasant agricultural production was to be kept to a minimum, concentrating on ways to extract surplus labour and produce from the existing production organisation.

In contrast to the taxation and groundnuts relationship which characterised much of the state-peasantry relationship during the colonial period,[1] the Baginda project stands out with its emphasis on capital investment in farm equipment, the construction of the first major irrigation works on the middle Niger River, and the promotion of fruit and vegetable crops for market sale. In this way, the Baginda project was a major link in the history of state intervention in agriculture which was gaining momentum in the early 1920s with the French Soudan's first agricultural colonisation project in Nyenebale and was immediately followed by the massive Office du Niger scheme at Segu.

The history of state-peasantry relations starts, of course, much earlier than the colonial era. Although documentation on the pre-colonial era is limited, some scholars have recently been able to piece together the historical development of states in the middle Niger region (Roberts

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1. The groundnut approach was not just characteristic of colonial state - peasantry relations in the French Soudan, but throughout the savanna 'groundnut belt' in West Africa from Senegal to northern Nigeria (Cf. Amin 1973, Suret-Canale 1972).

1987; Bagayogo 1982; Bazin 1982). Their respective studies show that some of the characteristics of the contemporary political economy of the middle Niger region can be traced to the era of the Segu state (late 1600s-1861). These Segu era origins form the base for analysing the changes introduced in the twentieth century by the French. Agricultural commodity and subsistence production pre-dates the colonial era (Roberts 1980); but, only during the twentieth century did the changes take place that have resulted in the widespread dual orientation--subsistence and commodity--prevalent today. In the case study village, this dualism is represented in the form of dryland grain farming and market gardening.

I have divided this chapter into two sections based on an outline of two kinds of articulation between the state and the peasantry during the twentieth century to show the connection between the study village and the broader twentieth century political economy of the Bamako and Baginda zone. The first section is on state intervention in the peasant economy with minimal disruption to existing peasant social, political, and economic structures. The second is on state intervention aimed at breaking down old structures and building new ones. The dichotomy was less clear in operation, with the implementation of policy often hesitant and contradictory. It can, however, provide a model for analysing current forms of state intervention in the peasant economy.

1. Intervention by Grafting on to Peasant Farming.

i. Pre-colonial surplus production and state predation.

Surplus agricultural production in the middle Niger valley had supported complex state structures long before the French arrived in the region. The colonial image of African agriculture as only subsistence oriented runs counter to the evidence for regionally specialised surplus producers. Large urban populations were supported by a rural surplus (Winters 1973). While economic history analyses of the middle Niger states have tended to highlight the role of war carried out by the state to produce slaves, agricultural production has long had the potential to produce beyond the needs of the household. This historical capacity to produce a surplus suggests that the farming system has, in some circumstances, flexibility to produce beyond the subsistence needs of the household.

The two principal ways through which the state and peasantry have been linked are through labour and tax. The relationship has historically been unbalanced: the state dominating the peasantry through enslavement, conscription, forced labour, and taxation. In the western Sahel region in general, and the middle Niger in particular, the history of state organisation is very long, dating to the first Christian millenium. The earliest reference to the Ghana empire is attributed to al-Fazari, a geographer at the court of the Abbasid Caliph in the late eighth century (Levtzion 1973:3). In 1068, Al-Bakri (El-Bekri 1965) described Ghana from the reports of travellers. The Arabic literature on the West

African states becomes richer with Ibn Battuta's (1966) geography of Africa based on his visit to the Malian empire in the 1350s, and references by others such as Al Omari (1927) and Ibn Khaldun (1986). The historical development of these states has been analysed elsewhere (Sow 1978; Levtzion 1973); however, a sketch of the development of the ruling warrior aristocracy is essential as a preface to the nature of state - peasantry relations in Segu during the 18th and 19th centuries.

At the heart of these states, during the period 1000-1600, war played a central role (Meillassoux 1978; Hopkins 1973). The dominance of successful warriors set them apart as rulers. Their successive victories were followed by the enslavement of conquered peoples. In this way, the economy of the great empires was based on war which increased the territory under domination and the capture of slaves (Meillassoux 1978; Hopkins 1973). The captured slaves were sold to merchants in markets such as Jene, Tonbuktu, Walata, and many were traded across the Sahara to the Maghreb with other commodities such as gold, skins, and spices, thereby entering the long-distance trading network. This war/production of slaves/sale-in-market sequence formed the backbone of the economy for these early states.

Long distance trade developed and prospered during the era of great empires. Through the organisation of a trading network among Muslim traders, trans-Saharan trade and trade between the savanna and desert, cities like Tonbuktu and Jene became large commercial centres. Gold, slaves, grains,

and other mostly raw materials were traded north to the desert, the Maghreb, and Europe. In exchange, desert salt, Maghrebian and European hides, cloths, and agricultural products were traded with settlements in Mali. Although the rulers of Ghana and Mali did not directly control the gold fields and therefore production, they extracted tribute from the producers and taxed the transport of gold and other precious goods along trading routes (Levtzion 1973:115-116).

The economy of markets and long distance trade was related to the slave raiding economy supporting the dominant political group. The slaves were themselves producers, and their presence in the market opened a new slave-based agricultural economy:

> Rent in kind or in labour thus earned [through the employment of slaves], permitted them [free peasants] to payoff their taxes in kind and to participate in the cereal trade between towns and the countryside. As a consequence, the general usage of slaves at all social levels among the class of freemen began. (Bagayogo 1982:26)

Here, then, is the establishment of one of the first relations between the state and the peasantry concerning agricultural production. The early imperial state itself was built on the dominance of warriors who lived off the sale of slaves captured in war as booty. They sold them to merchants operating within a vast West African commercial network which linked distant areas of specialised production. The expansion of slave markets in response to the demand in the Maghreb led to merchants based in the Malian region becoming a pole of accumulation. The development of

slavery to produce agricultural goods for the market thus can be seen as an expansion of the economy where merchant capital was being generated by the slave trade.

The role played by conquest and capture in the state intervention in the economy continued during the Segu state period (1700-1861). The market for slaves had grown considerably from the sixteenth century when Europeans established ports on the Atlantic coast and established slave-based plantation agriculture in the Americas. Writing with reference to Segu, Roberts establishes the war and slavery link to production and the economy:

> The moment we conceive of warfare and enslavement as work, as productive activity, the political economy of warfare and enslavement becomes explicable. (Roberts 1987:19)

The conquests were the means by which the warrior aristocracy gained control over production either through forcing the payment of tribute or by the direct enslavement of labour.

The political organisation of the warrior aristocracy that came to power in Segu may have originated in the *tòn* 'age association' (discussed in the next chapter) rather than the lineage structure (Roberts 1987:30-5). Biton Kulubali, the founder of Segu, was a *tòntigi* 'head of age association' according to oral history. Based on the *tòn* model, the Kulubali rise to power theoretically would not have meant the start of a dynasty, since the organisation of the *tòn* includes members from different lineages. The warrior aristocracy would have shared power. The influence of

the *tòn* structure was to introduce egalitarianism into the early leadership of Segu.

By the second half of the 18th century, the nature of the state changed. The Jara dynasty began with Ngolo Jara in 1765 who ended the warrior - *faama* 'ruler' equality founded on the principles of the *tòn*. The *tòn*-type structure was replaced with kingship (*faamaya*) when Ngolo Jara forced the other warriors to submit to his rule (Roberts 1987:43).

The early success of the *tòn* was based in war. As in the past, the submission of villages led to the capture of slaves. The war - slave economy thus served the foundation of this new state. Military victories extended state rule as *kafow* 'small-scale polities' were defeated and incorporated into the Segu political and economic system. The mid-eighteenth century was the height of the Atlantic slave trade and the capture and sale of slaves in the Segu-controlled interior fed the coastal markets. Segu saw the turning of the orientation of trade away from trans-Saharan to coastal and trans-Atlantic destinations.

At the level of the domestic economy, villages through their production units (*duw*) had to produce a surplus for the state. In some villages in the immediate, central zone of Segu, a special field unit, the field of the ruler (*faamaforo*) was established to produce crops destined for the state. The market offered an option to households able to produce significant surpluses to invest further in produc-

tion by purchasing slaves.[2] Peasants could invest in slaves to increase the production of their farms. The state benefited from increased trade by taxing commerce.

As Roberts (1987, 1980) has documented, the Maraka ethnic group was able to capitalise on its market contacts to invest in slaves to produce specialised commodities, like indigo and millet, for trade to other ecological zones. The demand for such trade had historically been an effect of geography: no millet, for example, could be grown in the area where salt was mined in the desert thus assuring a market for surplus agricultural goods. In cities, those involved in the running of the state and industry also created a market for agricultural goods (Winters 1973).

When the French state began to take form in the twentieth century, there was already a long history of surplus production by the peasantry supporting state structures. This is significant in that it prompted the French, at least initially, to maintain the existing structure of peasantry - state relations in order to make the peasantry work for the state. In this way, the *forobaforo* 'common field' of the *du* 'household' could become a production site for commodities that would enter into the colonial and international circulation of goods. In the 1880s, the colonial administration, argues Roberts, deliberately 'tinkered with market forces' to coax peasant farmers to produce crops that would

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2. See Chayanov (1966) and Goody (1958) on the theory of the domestic cycle to explain how household labour can periodically increase to produce surpluses.

supply the Bamako market and thus the growing urban population (1987:146-7). Later, by requiring a head tax, peasants were forced to grow crops to earn the necessary cash to pay the tax. As a result, groundnuts were grown all over the western and central Malian region.[3] The French thus began to change peasant agriculture by grafting on to the existing structure of the domestic economy long established to produce a surplus.

ii. Colonial state appropriation of peasant land and labour.

Tax was the chief means by which the colonial administration could directly benefit from the surpluses generated by the peasantry. They could collect taxes without completely disrupting the *du* structure. The attitude of the colonial administrators in implementing policy was a combination of disdain and paternalism. As Jones says,

> Most administrators considered their administratees so indolent that they could be induced to produce crops for market only by imposition of head taxes and establishment of quotas of cash crops.... (1976:24)

The head tax in Bamako dates to 1896-97. Between 1901-04, it was introduced to the rest of the colony to 1) supplement the customs duties as a source of revenue to the state budget, 2) supply workers for industry by forcing farming families to send workers into the wage earning sec-

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3. Under colonial rule, the territory was known as the Soudan or the Soudan Français.

tor, and 3) provide a regular supply of export products to the colonial companies (Bagayogo 1982:44). It had the effect of advancing the monetisation of the economy. In Soro, elders remember that the colonial tax was first paid in cowrie shells (*kolonkisèw*),[4] and then in tokens (*warijèw*), and then bills.[5]

The pre-French crops cited in Soro include: millet and sorghum (varieties: *keneke, sanyò, ngende, wiyanka*), fonio, groundnut, cowpea, cassava, sweet potato, Voandzeia, rice, and papaya. The French are remembered as introducing mangoes. Groundnuts, however, were especially related to French colonial rule. Before each wet season, the *canton* chiefs installed by the French were called together. Some villages were given new chiefs if the administration did not want the existing chief, but this did not happen at Soro.[6] They were told to make sure that farmers grew groundnuts to pay tax and pay for marriages. Groundnuts were furnished at the household level and grown in the household field (*foro-baforo*).

Due to the colonial policy, groundnuts and cotton have been the major commercial and export crops during the twentieth century (Fig. 1.2). As early as 1908, groundnuts made

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4. A Soro elder showed me his *kolonkisèw* that he has retained.

5. The informant noted that currency was especially disliked because it had no value.

6. On the transformation of a *kafo* or *jamana* 'country' into a *canton*, see Hopkins (1972:32-40) for the history of Kita, and Amselle (1985) for the area southwest of Buguni. See Ernst on the colonial state's promotion of certain chiefs (1976:71-72).

up 13% of the value of exports from the Senegal River port at Kayi. At that time, non-cultivated goods, such as kapok, ivory, and gum arabic dominated the exports, which also included shea butter and ostrich-plumes (Keïta 1972:57). Groundnuts grew to 30% of the value of exports in 1928, and then 50% in 1939 (Amin 1965:52) before they peaked in the 1950s when they made up over 90% of the value of Senegal and the French Soudan's exports. In the 1950s within the French Soudan, the Bamako-Segu region produced 43% compared to the southwest's (Kayi, Bafulabe, Kita) approximately 35% (Suret-Canale 1972:204-5). By the late 1970s and early 1980s, the value of exported groundnut products had slid below 10% of the total value of Malian exports, trailing far behind the cotton exports which in 1983 were worth 44% of the total value of exports (Ann. Stat. 1984 1987) (Fig. 1.2). Cotton was first exported in commercially significant quantities only in the late 1920s (Amin 1965:25; Expo. Col. 1931:42, 62-3)

Although the statistical data are incomplete for the entire period, available evidence suggests that appropriation of land by the colonial state in the form of the expansion of groundnut production after the Second World War was displacing subistence crops on peasant lands at least in the *cercles* around Kayi where groundnut growing was concentrated. The 1950s were the height of the groundnut era. In the Kayi Region, 74% of the groundnut harvest was commercialised in the 1951-52 season compared to 61% for the whole of the Soudan. The abundant rains of 1958 accounted for a record

commercialised harvest in the French Soudan of 98,000 tonnes before shelling. The post-war groundnut boom began to have an impact on the production of food crops with Kayi importing millet and rice from Bamako, Segu, and elsewhere in the Niger basin. In most areas of the French Soudan, however, land was plentiful, so that if labour were available the area under culltivation could be increased raising groundnut production while maintaining grain production; production was extended with the clearing of more land, not intensified to increase yields per unit area (Keïta 1972: 144-50).

Much more significant than land appropriation, the colonial state appropriated peasant labour through the organisation and promotion of mass labour migrations to Senegambia's groundnut growing regions. Migrant agricultural workers known as Strange Farmers in Gambia or *navetanes* 'seasonal agricultural workers [Wolof]' in Senegal went to the Senegambian region from neighbouring regions and countries to work for a season, or several seasons in sharecropping arrangements with their landlords (*jatigiw*) (lit. 'hosts') dating to at least 1848 (David 1980:12). The French Soudan's contribution to this migration was always considerable, sometimes reaching over 50% of the *navetanes* in Senegal. The colonial state was very interested in manipulating this labour resource. In 1946, for example, immediately following the second world war when oils were scarce in the world market, the French used many inducements to attract Soudanese farmers to the groundnut growing areas

of Senegal (Keïta 1972:136).[7]

The migrant workers of Senegambia, as well as those who left the Soudan to work on cocoa plantations in Ghana and Côte d'Ivoire, represented a new appropriation of labour by the state and colonial industries. The concurrence of the end of slavery and development of hired labour associated with cash crops, argues Swindell, was more than coincidence:

> This 'reserve' of labour [freed slaves] was mobilized as slavery decayed..., as the colonial authorities realized the necessity of a large mobile wage-labour force to develop new transport infrastructures and mines, but most of all agricultural export crops. (Swindell 1985:117)

In 1905, slavery was abolished in the French Soudan, initiating an exodus of former slaves from areas such as Banamba north of the Niger River south to Wasulu, Jitumu (Map 3.1), and other areas where they had been captured during the Samorian war (Roberts 1987:184-207). Some also went to Bamako. The growing demand for labour in Bamako and other towns was met in part by liberated slaves. Most slaves had been agricultural workers and thus sought to return home to work the land with their own people.

Such was the case of the ancestors of one of Soro's families. Besi Dumbia left Madina in the Kingi Canton of Nioro Cercle at the time of abolition (1905). The Dumbias

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7. The colonial state promised Soudanese farmers willing to become *navetanes* free transportation, free cloth, a renumerative groundnut price, and food advances. The promotion was largely unsuccessful since only about a third the number of Soudanese workers migrated in 1946 as in 1945 (David 1980:473; Keita 1972:136).

left to go to Segu. But, the story goes, Besi's younger brother had a bad leg and rested under the big baobab tree of Soro. The next day the then Soro chief told Besi to think of the children and to spend the wet season in Soro, and afterwards to continue on to Segu when rested and healthy. They stayed and never left. Today, the status of the descendants of slaves in Soro does not seem to bear upon their relations with others.[8]

In addition to the pressure to enter the labour market caused by taxation, military conscription was another means by which peasants were forced into the service of the state. Not all soldiers, though, were drafted into military service. Many also enlisted as a way to enter the labour market to earn cash, especially since their were so few employment alternatives. As a result, the Soudan contributed a high proportion of the soldiers recruited in French West Africa serving the French army (Jones 1976:25). During World War I, peasants were recruited throughout Mali, touching off the 1915 armed revolt in Beledugu (Traoré 1962). In Soro, Saba Kulubali is remembered as having gone to the war in France and never returning. Wojuma Kulubali who fought in the Second World War was taken from the chief's family and forced to go to a French school. He was the first from Soro to attend school. Today there are four veterans of French military service in Soro, one of whom was in France and two

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8. An outsider to the community would, however, need to spend considerably more time than we did with members of the village to evaluate such a subtle aspect of social status.

in Dakar during the Second World War; the fourth spent two years in Indo-China (1948-50).

The young in all villages were required to work (*travaux forcés* 'forced labour) for the state. The time period for this corvée was usually 15 days. From 2-20 young people would be taken depending on the size of the village. No salary was paid. Every 15 days another group was taken. They would build roads, moving rocks by hand. No food was given. They had to take their own couscous. There was always a *garde de cercle* present to prevent escape. When asked about resistance, the informant laughed and said that there had been incidents of taking the guard and beating him. Those who fought were taken to Bamako for punishment. Forced labour was also a penalty for non-payment of tax. In Soro, one elder remembered that if you did not pay the tax you had to dig the canal (Baginda, late 1920s; see next section) or build the road to Segu. Another, who was not living in Soro at the time, remembered porterage in the Faya Forest, northeast of Soro, where each man was made to carry a stere of wood on his head from the forest down to the river.

This brief and fragmented account of the Soudan's experience with taxation, conscription, and forced labour is illustrative of the state - peasantry relationship during the colonial era.[9] I present it as it is remembered in the village: an intrusion in the way of living. It was the

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9. Cf. Bassett 1988, Watts 1983, and Amin 1973 for examples from other regions.

beginning of the process by which the moral economy was influenced by new forces. Land was plentiful, but there are some indications that forced groundnut cultivation by the peasantry was a form of appropriation. Labour was scarce, however, and the state desperately needed the peasantry's labour and produce. It used a combination of policies based on force and inducement to secure labour for administration, the military, construction of transportation networks as well as commercial and administrative enterprises, and the development of agricultural commodities.

iii. Post-independence (1960-68) agricultural extension and collective fields.

Having briefly presented the precolonial and colonial history of the intervention of state in the peasant economy, I will now examine the changes after independence. The leadership that held power in 1960 at independence represented conflicting interests born of the development of the Malian political structure (Dembélé 1987, 1981; Diarrah 1986; Diakité 1985; Jacquemot 1983; Bagayogo 1982; François 1982; Ernst 1976; Diop 1971). Of the two main parties formed after the Second World War, the peasantry supported the Union Soudanaise Rassemblement Démocratique Africain (USRDA).[10] In Soro, Fily Dabo Cissoko's Parti Progressiste Soudanais (PSP), the main rival of the USRDA, had no support and was considered the party of the French. When asked who

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10. Some Soro elders still had their party cards dating to the 1950s.

supported it, village elders said some traders in Bamako supported it. Indeed, those most integrated into the colonial state structure stood to gain from its policies and therefore supported the PSP (Diakité 1985:53). The peasantry most detested the PSP policy to maintain *canton* chiefs. In Soro, an elder said that everyone had been *konate fè* 'with Konaté' (Mamadou Konaté, leader of the USRDA) because he was for the *farafinw* 'Africans'.

From the first years of independence, agriculture and particularly peasant agriculture were high priorities for state investment, partly a reflection of USRDA's debt to the peasantry. Villages were at the base of a structure for the improvement of agriculture and rural living conditions as a whole. Peasants were organised to collectively farm village fields in addition to their household fields. The produce of these collective fields was to benefit the village through the sale of commercialised crops to the state-owned marketing company and the raising of cash for the village council to use as it saw fit, e.g. tax assistance to farmers in need, stocking of dispensaries, purchase of agricultural equipment.

Implementation of policy did not follow the plans, however, with funds being diverted elsewhere (Dembélé 1987, 1981; Diarrah 1986; Kébé 1981; Jones 1976; Ernst 1976). The USRDA attempted to reorganise production at the village level, with the village collective field the chief spatial manifestation of state policy. For some peasants, the village collective field was reminiscent of work on the ruler

of Segu's (*faama*) field (Ernst 1976:87). In Soro, at least, the field became associated with obligation (*waajibiya*), and was known in the Baginda and Wèlèsèbugu areas as the state's field (*maliforo* or *gufòròna nanforo*). The collective field programme has been much criticised not only for the obligation aspect (e.g. Jones 1976) but for its failure to fully come to grips with local needs in Malian villages (Dembélé 1981; Ernst 1976).

The successes of that experiment within severe post-colonial world economy constraints have been overlooked and may provide valuable information to present and future planning. All collective village fields initiated by the USRDA did not vanish in every village at the moment of the November 1968 *coup d'état* which removed Modibo Keita and the USRDA from power. Rather than a complete disappearance, though, where village leaders saw them in their interest, some collective fields remained and were transformed to meet local needs.[11] In one village near Wèlèsèbugu, the village collective field that until 1968 was the USRDA creation, continued to be cultivated in 1987 even though the crops had changed to suit the needs of the village council. In Soro, the village collective field was abandoned only in 1984. Until 1968 it had produced cotton, but the village changed to millet and used the produce as a security for families during times of need.

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11. In contrast, Jones (1976:293) said: 'After the December 1968 coup collective fields were abolished and quickly disappeared. In 1969, none were to be found.'

iv. Development priorities 1968-present.

Today, the Opérations de Développement Rurale, the rural development agencies, are state and para-statal enterprises whose chief interest is the increased production of commodities by peasants. They operate the official markets for cash crops--especially cotton, peanuts, and rice--and organise the export of crops to foreign markets. The ODRs have a spatial and crop type orientation. For example, Opération Riz - Mopti is a Mopti-based rice development project. Soro is located in the zone of Opération Haute Vallée (OHV), which is concerned primarily with commercialising tobacco, cotton, groundnuts, maize, and rice in the upper valley of the Niger.

Using official crop figures, it is difficult to show appropriation of peasant land by the state in the form of an increased share of cash crops relative to food crops. The difficulty arises in part from the interpretation of dubious figures used in the official statistics books.[12] In addition to the statistics problems, Mali still has a relatively large amount of land available for clearance and expansion of cultivated land. If farmers had the tools and labour to

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12. Dembélé (1987:233) comments on the problem of records. A further complication in compiling crop statistics is the mixture of crop uses even for the two major so-called cash crops of cotton and groundnuts. These crops may be consumed by the social unit which produced the crop, exchanged or sold in the village in crude or processed form (i.e. homespun cotton or cloth in the case of cotton, or roasted nuts or peanut butter in the case of groundnuts), sold in local markets in the same variety of forms, or sold to state or private enterprises. Only in the last case would the commercialised crops have a chance of being recorded by official records.

expand crop production, land might become a major constraint.

Table 4.1

Growth Rates of Food and Non-Food Crops, Mali

Avg. annual growth rate of volume of production 1969-71 to 1977-79			Avg. annual growth rate of total production per capita 1969-71 to 1977-79		
food	non-food	total	food	non-food	total
1.0%	9.6%	1.4%	-1.6%	7.2%	-1.2%

Source: Accelerated Development... 1981:167

There is, still, some evidence to show that the state is appropriating peasant food-producing land for the production of export commodities. In 1981, the World Bank published figures on Malian agriculture for the decade 1969-79 showing a decline in the per capita growth rate of food production (-1.6%) (Table 4.1). For the same period, non-food production was growing at an annual rate of 7.2%. Several years during this period were marked by drought with severe regional food shortages and famine. In 1975, 113,600 tonnes of grain as food aid was imported by Mali (Acc. Dev... 1981:166). That, using the annual agricultural survey statistics, was equal to 10% of the grain (including millet, sorghum, rice, fonio, and maize) produced in Mali in 1975. In the same year, 45 thousand tonnes of cotton were grown on 61 thousand hectares (Ann. Stat. Mali 1975-77 1982: 190,200). Using official figures, the Organisation for Economic Co-Operation and Development (OECD) has noted that

the share of food crops has been declining relative to cash crops during the period 1960-1983 (Lacaillon and Morrisson 1986:94).

Current rural development policy is to encourage the formation of *tòn villageois* 'village cooperatives' at the village level to facilitate commercial production, access to credit, and peasant acquisition of equipment, seeds, and fertiliser (Si 1986). The origins of this programme dates to the early 1970s in the area of southern Mali where the Compagnie Malienne de Développement des Textiles (CMDT) is most active. In the 1973-74 agricultural season, Totambugu near Fana became the first village organised by the CMDT as an Association Villageoise (Traoré 1984:71). Like its predecessor USRDA programme, this approach built on the existing social structure of chief (*dugutigi*), village council, and youth organisations. These groups were to take on new functions oriented towards agriculture including administering credit.

The main objectives were: 1) collective resolution of agricultural problems, and collective representation of farmer interests in relations with the agricultural extension agency, 2) improved marketing conditions by providing access to credit and equipment, and 3) the use of revenue from a collective field for investments in such materials as wells, maternity hospitals, literacy centres, and tractors that would be of use to the entire community. Not all villages wanted or could qualify for such a reorganisation since there were specific criteria for the choice of As-

sociations Villageoises, including the presence of: communal structures (*tònw*), someone literate in Bamana, French, or Arabic, cash crops (esp. cotton), and a certain technical level (as with widespread oxen ploughing) capable of relatively high yields.

Several years later, the Union Démocratique Populaire du Mali (UDPM) decided to transform the CMDT programme into a national rural development scheme called *tòn villageois* 'village association'. It is being implemented by Ministry of Agriculture and Opérations de Développement Rural (ODR) agents but by no means yet covers all Malian villages. Indeed, as is evident in the criteria for selection, only certain villages are eligible. In 1987, Soro did not have a *tòn villageois*, but neighbouring Munzun did.[13] The OHV and Ministry of Agriculture agents with whom I spoke in Munzun and in Baginda were particularly concerned with 1) problems in getting the *tòn villageois* accepted and launched, and 2) encouraging the farmers to grow marketable crops, notably cotton.

Soro farmers were somewhat reluctant to openly discuss government programmes such as the *tòn villageois*, but moreover were suspicious of the programme because of a long

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13. Munzun farmers, the Munzun *tòntigi*, a forestry intern stationed at Munzun, a Ministry of Agriculture official at Baginda, and Soro farmers, all gave contradictory information on the number of years that the Munzun *tòn villageois* had existed. I found that the reason for this was the lack of success that the initiative had had in its first years. Clearly, Munzun was in at least its second year and possibly its third or fourth year of collective field cultivation under the *tòn villageois* programme.

history of feeling cheated by the state.[14] On the one hand, the mood was characterised by an attitude to wait and see what happens in Munzun, and on the other by a willingness to see what the government had to offer. For most of the country, the *tòn villageois* concept is still only just beginning to be changed from a theory to a real development programme. Even if the programme is as sound theoretically as its proponents say it is (Jeune Afrique July 1987), the national treasury is not in a strong position to provide sufficient financing for all the equipment and training required.

The fact that the national development programme is modelled, at least in part, on the experience of the cotton company should be no surprise. Like its colonial predecessor, the Malian state since independence has concentrated its agricultural development efforts on the production of commodities, most notably cotton. That concentration has meant, though, the neglect of other sectors of the economy and other geographic regions. Indeed, the growth of cotton, today's most valuable cash crop, took place during a period when drought contributed to food shortages in many parts of Mali. It can be argued that had development priorities been

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14. The history of being cheated includes not only the misdeeds of colonial authorities, but also the village collective field, and misappropriated international aid aimed at the peasants. It also includes the presence of the president's *foro* 'field' near Sunuguba. The head of state is believed to have 340 ha, some of which is irrigated by automatic sprinklers. While the origin of this capital investment is questioned in private, this farm's production statistics would provide valuable information on Malian agricultural potential with capital intensive farming.

different, the wetter south where cotton growing is concentrated could have contributed more grain to the deficit regions instead of increased cotton harvests for the world market.

2. Intervention by the Establishment of a New Farming System: The Development of Irrigated Agriculture at Baginda.

i. Building the irrigation works and colonising the Baginda Plain.

Taking the Soudan as a whole between 1918 and 1932, Roberts (forthcoming) has identified a struggle within the colonial administration between supporters of two kinds of agricultural development: a model of peasant-based agriculture versus one of European managed capital intensive irrigation. Proponents of the latter model were eager to introduce new agricultural techniques to the Soudan based on scientific method--soil nutrient analysis, irrigation, etc. --to increase production. The Niger River flowing through the territory was an obvious inspiration to irrigation-based schemes to control water in areas dependent on seasonal rains or floods.

The first village in the colony where farmers had been recruited to come to work using capital intensive farming methods was Nyenebale, 12 km from Kulukòrò. It was established in 1921 as an experimental station for irrigated cotton growing and received its first recruited farmers in 1926. Its success helped provide the proof that a larger project would be possible and supported the initiative for

the Baginda project and the rest of the Office du Niger project (Roberts forthcoming; Magasa 1978:39).

At Baginda, as at Nyenebale and later in the Office du Niger lands north of Segu, the state tried to initiate major changes in the methods and means of agriculture, as well as reorienting farming objectives toward the market. The position of the state was stated clearly in a 1930 report:

> Here then is the problem: to make the native collaborate in intensive production, by having him work land in the developed regions which is his property using modern means and processes, and to manage to recruit a population dense enough to ensure that farms have the necessary workers (ANF, RR, p1).[15]

The first major test of irrigated agriculture in the Soudan, Baginda was to be a model agricultural development project to smooth the way for financing from Paris for the much more ambitious Office du Niger project further downstream north of Segu. The first water works were built beginning four kilometres downstream from today's bridge across the Niger at Bamako on the right bank with the intention of irrigating the Baginda plain with Niger River water. The work started 3 December 1925 at the Sotuba Rapids with the beginning of work on the Barrage des Aigrettes and the Baginda canal (Magasa 1978:114).

The works were part of an integrated project to transform the nature of agricultural production. Irrigation was only part of the technical and social changes envisaged.

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15. I am indebted to Richard Roberts for collecting and drawing to my attention this quotation.

The goal was to intensify production by African peasants. Crops were to be sold for cash. The effect would be to monetise the agricultural economy, alienate land, and orient production toward the market. It was the introduction of agri-business to Mali. Contract bids were invited from around the world.[16] The planners had to find farmers willing to embark on such an experiment. Indeed, labour shortage was a major constraint.

A colonisation project was drawn up, with new villages, building designs, land allocations, political structures, all new and planned to meet the state's objectives. The labour that was requisitioned for the construction of the project's infrastructure, including canals, roads, and buildings, came from villages in the surrounding regions and was barely paid if at all. In March and early April of 1930, for example, 257 unskilled workers were sent to Baginda from Bamako and Segu.[17] In early July, a request was sent from the Governor of the Soudan to the Commandant

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16. One potential contractor wrote from as far away as California, where rapid technical changes in agriculture, especially in the conversion drylands into irrigated farming zones, had obvious relevance to the Niger case. A letter dated 25 October 1930 from The California Corrugated Culvert Company advertising its irrigation drainage systems, illustrates the involvement of international agri-business. The letterhead of the cover letter advertised its corporate branch structure, with the head office in Berkeley, California, and branches in Los Angeles, El Paso, Houston, Dallas, and Ashland, Kentucky. 'Representatives in the Important Cities of the World', it promised before the letter written in French asked, *'Quel est votre problème de transport?'*. It was signed by the company's 'Directeur-Adjoint du Département d'Outre-Mer' (ANM, 1-R-333).

17. Contrôleur de la Colonisation, handwritten note, 8 July 1930, Baguineda, ANM, I-R-34.

of Segu for 200 workers to relieve those working since the beginning of April. The telegram spelled out the terms of employment: 'Terms of work obligation around 3 months - Stop - daily pay two francs plus ration.'[18] Fifty were requested from Bamako. It was commonplace for the amount of time to be unfixed, making the service that much more difficult for the workers who needed to return to their own families and farms.

In its programme to recruit farmers who would colonise the new villages and supply labour to the newly irrigated lands at Baginda, the state turned to the hinterland, the villages 10-40 km south of the Niger River.[19] A map dated 18 December 1928 by the Agricultural Credit and Colonisation Inspector shows the land to be irrigated by the Sotuba - Baginda Canal, the *cantons* of Mèkètan, Muntugula, and Mofa.[20] The map was apparently intended to provide a rough census of the southern hinterland area where recruitment for the colonisation of the irrigated zone would take place.

The ideology of the colonisation policy was to avoid

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18. Gouverneur Soudan Terrasson, telegram to Ségou, 5 July 1930, ANM, I-R-34.

19. For example, 61 people came from Sebela in Megetana in 1932 (Girault, Rapport Politique du 2e trimestre 1932 de la Subdivision de Bamako, 18 Aug. 1932, ANM, I-R-34). At the national archives in Bamako, I found very little documentation on the origin villages of the people colonising the irrigated plain.

20. A. Rinneul, Contrôleur du Crédit agricole et de la Colonisation, Canal de Sotuba, Carte démographique de la région de la rive droite du Niger avoisinant le canal, Koulouba, 18 Dec. 1928, ANM I-R-45. The handdrawn colour map includes Soro within the Muntugula canton.

undermining the lineage-based agricultural system in villages. Colonial policy was not hesitant about the need to preserve the existing village structures. In his response to the concerns raised by the Governor General of French West Africa in Dakar, about political ties between source villages and newly colonised villages, the Lieutenant Governor of the French Soudan affirmed in August 1932 that:

> The rupture of political ties between new villages and original villages does not imply the total and definitive rupture of existing relations between the members of the separated groups. The status of these natives remains unchanged, and only the attributions normally alloted to the representatives of authority are transfered to the new *canton* and village chiefs for that which concerns the new groups.[21]

The inhabitants of these new villages who came from the villages in the southern hinterland thus brought with them existing internal social relations. Viewed from the objectives of the state, the creation of new, colonised villages in which no radical change in the social and political relationships occurred from that which had existed in the old, hinterland villages was not contradictory. With the maintenance of existing relationships, the new villages on the irrigated plain became extensions of the villages supplying the colonising farmers, spatially separated by up to 30 km. But, as the Lieutenant Governor made clear later in the same letter to the Governor General, the ultimate objectives of colonial policy were firm control of labour for the service

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21. Fousset, Lieutenant Gouverneur du Soudan Français, Koulouba, 12 Nov. 1932, ANM, I-R-44.

of the state:

> In my opinion, what must be required is an administrative separation--and only administrative--but very clearcut, between the villages of origin and those of colonisation. In practice, this distinction will lead to the following: the natives of a new village [*village de colonisation*] will remain subject to the duties of all the natives in the region--taxes, colonial service, obedience to recruitment laws and administrative rules. No exceptions will be allowed.

In 1931 on the plain to be irrigated, there were four old villages--Baginda, Sunuguba, Kobala, and Dugurakòrò--which pre-dated the canal and three (more later) new--Niognan, Cèma, Kokoin. In all the villages, the living conditions were harsh and the colonisation programme was in most cases hard to distinguish from the labour requisitions. Indeed, the parallel was not missed by the colonial administrators: 'The European must show great tact in guiding the native to assimilate our farming methods without this becoming forced labour for the latter.'[22] In a report by the Chef du Service de l'Agriculture to the Governor dated 20 May 1932, birth rate and mortality figures for the two sets of villages were given (Table 4.2). The explanation for the higher rate of death than birth in the new villages was attributed to the malnourishment of the new inhabitants of the Tanima Plain.

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22. Contrôleur de la Colonisation Bouvier, Assoc. Agricole Indigène de Baguineda Rapport 1930, 26 Feb. 1931, ANM, I-R-45.

Table 4.2

Birth and Death Rates
during the First Years of the Baginda Project

Birth Rate, 1930,1931.

Old Villages	27.2/1000
New Villages	25.3/1000

Mortality, 1930, 1931.

Old Villages, first two years	18.9/1000
New Villages, first six months	28.9/1000

Source: ANM, I-R-325.

This form of state - peasantry relations as first practiced in Nyenebale and Baginda, Lieutenant Governor Fousset concluded, would constitute the model for colonial development elsewhere. Its policy formation involved the highest levels of French West Africa's colonial administration. The establishment of the new, irrigated agricultural system in Baginda was evidently of paramount importance to French administrators seeking radical changes to the ways in which the state harnessed the productive capacity of the peasantry. The groundwork was laid for greater state investment in peasant agriculture, as well as the brutal subordination of the peasantry to the interests of the state.

ii. Organising production: New crops, new farmers.

The project laid the groundwork for a new kind of commodity-producing peasant, the decline of the moral economy, and the development of new conflicts within the farming system even outside the project area. In 1931, the state took a step further in fostering the development of commercial

agriculture. Under Articles 37 to 41 of the Decree of 26 June 1931, the Association Agricole Indigène de Baguineda (AAIB) was created.[23] Its members were restricted to the heads of families (*dutigiw*) of the villages on the plains: Dugura-kòrò, Kobala, Baginda, Sunuguba, Gnognon, Cèma, and Kokoin. Colonial policy was to work through these village elders, supporting their village and household positions of authority.

Originally the administration aimed to grow rice in the irrigated zone in Baginda, but the farmers recruited to grow it were not experienced with growing irrigated rice. They needed practice and equipment. In its first year, 1,966 ha were cultivated by the AAIB members of which 85.6% was rice, 9.0% millet and maize, 3% cotton, and 2.4% other crops, including groundnuts, sweet potato, banana, tobacco, and garden vegetables.[24]

The AAIB was destined to create debts for its peasant members. In its first year, 517,389 francs were spent on construction in the seven villages.[25] The debts only increased and became impossible to pay off except through forced labour (Bagayogo 1982:172-3). The objectives of the AAIB were spelled out by its members in 1939: 1) making land improvements, e.g. irrigation and drainage, building

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23. ANM, I-R-44. The AAIB was accompanied by another creation of the administration, the Association d'Intérêt Général Agricole (AIGA).

24. AAIB, Rapport sur les Opérations de l'Association: Campagne 1933, Baguineda, 20 Jan 1934, ANM, I-R-45.

25. ANM, I-R-45, op. cit.

villages, roads, and factories, and planting useful trees; 2) acquiring tools, animals, seeds, plants, fertiliser for members; 3) acquiring or renting for common use breeding animals and everything else needed for agriculture; 4) eventually to secure credit for members' construction projects; 5) to sell the products of members.[26]

In pursuing the development of irrigated agriculture, the French granted concessions through a policy encouraging family farm enterprises. As well as becoming important commodity producers, these farmers were expected to serve as models to the peasantry for introducing new farming techniques and crops. The colonial administration enacted a 10 ha limit on land parcels between Baginda and Kòba. The first five large farming concessions were granted in 1930 on the Baginda land. The early fruit growing orientation of the five concessions is evident in the following list of fruit and tree crops in 1931: 100 grafted mangoes, 2730 non-grafted mangoes, 67 oranges, 184 *pomme canelliers*,[27] 573 bananas, 108 lemons, 31 pomegranites, 58 hennas, 87 pineapples, and 10 dates[28].

By 1938, 300 ha of fruit concessions had been allocated at Baginda, benefiting civil servants seeking to invest

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26. Statuts AAIB Formation, 1939, ANM, I-R-34.

27. Annona squamosa (*tubabusunsun 'sunsun* of the whites' in Bamana), an indigenous West African fruit tree (Busson 1965:180), but not from the Bamana-speaking zone.

28. Chef du Service de l'Agriculture, letter to the Gouverneur de Soudan Français, 20 May 1932; Colonisation des Plaines de Baguineda, 1928-30, Correspondance diverse, ANM, I-R-34.

their earnings to improve their living conditions:

> It is worth noting that the concessions were requested by native civil servants who build comfortable houses covered with corrugated roofs. (ANM, I-R-34, op. cit.)

Colonial authorities in their racialist view saw one of these new capitalist farmers who was *métis* as a model to African farmers in adapting French farming methods. These early concessions in Baginda and Kulukòrò, as Bagayogo has shown in his thesis (1982), established the base for the formation of an agrarian bourgeosie. The history of orchard growing and market gardening is inseparable from this early granting of concessions to African bureaucrats during the colonial era.

In summary, Baginda was 1) a test site for new state - peasantry relations, 2) showed the hegemony of the state in agriculture, and 3) was a site of agricultural introductions --crops, tools, policy. By the beginning of the 1930s, the attention of colonial agriculture developers had already turned from Baginda to Segu and the much larger scale Office du Niger project. The Office du Niger project was the focus of French colonial agriculture in the Soudan colony. It received the most investment and always carried the greatest prestige. Its history has been analysed elsewhere revealing the continued effort on the part of the state to introduce by force an irrigated agricultural system oriented toward a few commercialised crops (especially cotton and rice).[29]

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29. For more on the Office du Niger, see Magasa 1978, Amin 1978, DeWilde 1967, Herbert 1939.

The legacy of the Office du Niger continues to hamper efforts to improve its image and most importantly its production and contribution to the welfare of its workers and the country as a whole.

iii. Developing an agro-industry.

At independence, economic development was naturally a preoccupation of state planners. The inherited colonial economy lacked industry. The country's potentially vast agricultural resources were recognised at the same time as were their underdevelopment and lack of industrial sector support. An effort was launched to develop industry that would support agriculture and generate much needed capital for the country. Established in 1962, the Société des Conserveries du Mali (SOCOMA) fruit and vegetable processing plant at Baginda began operating in February 1964 as Mali's first industrial complex. SOCOMA was to operate in conjunction with the newly established state farm at Baginda. The Baginda site was a natural selection because of the history of fruit and vegetable farming there, as well as the development of agriculture oriented toward the market.

Built with Yugoslavian and Bulgarian financing and technical assistance, the plant cost 245.4 million Malian francs[30] and was expected to process 15 tons of tomatoes per day to make tomato paste, plus produce juices and jams. The first years were burdened by heavy losses (Table 4.3). The

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30. This figure is quoted from Cissé 1981:136. Marchés Tropicaux... 1980:71 says 232 million Malian francs.

1967-68 figure shows a great cut in the loss. Jones noted that the facilities functioned well for the most part, but that marketing was neglected (1976:262). Production and marketing seemed to have been hampered in part by the need to develop a regular market for the products. In 1968, the Soviet Union bought 550 tonnes of mango, tamarind, and guava juice from SOCOMA, and 200 tonnes of the concentrated tomato sauce was sold in Mali (Marchés Tropicaux... 1980:71); but in 1972 SOCOMA produced only 120 tonnes of mango juice, 32 tonnes of creamed mangoes, and 80 tonnes of tomato paste (Plan Quinquennal...1974:288).

Table 4.3

Baginda Cannery's Early Financial Losses[31]

1964-65	-86 million Malian francs (MF)
1965-66	-98 million MF
1966-67	-82 million MF
1967-68	-3 million MF

Source: Jones 1976:250

Peasant farmers were producing tomatoes for sale to the Baginda plant from as far away as the left bank of the Niger southwest of Bamako (Jones 1970), but most came from the state farm at Baginda. By 1968, however, the difference in the price paid to the producers by SOCOMA and the Bamako market was too great.[32] Peasant farmers could easily re-

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31. No current production figures are available.

32. One kilogram of tomatoes at the Bamako market was worth 30-100 MF; at the Baginda factory it was worth 20 MF (Bagayogo 1982:90).

orient their sales to the open market, but those living in the Baginda irrigated zones had few options to earn cash and were forced to sell to the factory and bear the burden of paying for the loss-making enterprise. Bagayogo has identified the contradictory objectives of the state at Baginda of assuring a prosperous future for the expanding rural concessions and promoting small peasant market gardening, while simultaneously attempting to carry out state accumulation of capital (Bagayogo 1982:90).

SOCOMA had other problems. In 1972 it produced at only 6.7% of its capacity for tomato paste. Demand for tomato paste was rising in the urban centres. By 1974 demand was estimated at around 1000 tonnes (Plan...1974). Baginda was organised into the new regime's--that of Moussa Traoré--rural development programme (ODR) as Opération Baginda. Under the ODR, French advisers recommended dividing production into two groups: 1) farmers close to Baginda would produce tomatoes for the factory, and 2) those to the west on the Koba plain closer to the international airport at Senu would be trained to grow green peppers for export to Europe (Bagayogo 1982:91).

Although SOCOMA was not making the most of the growing domestic market, it was targeted for modernisation and expansion in the economic plan starting in 1974 (Plan Quinquennal...1974:288). Pineapple and nsaban[33] fruit juices were added to the production line, now with new Italian

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33. This is the Bamana name for the indigenous fruit variously spelled *zaban, nzaban, nsaban* (Saba senegalensis).

equipment and a capacity of 4,800 tins per hour (Marchés Tropicaux...1980:72). In the 1974-75 season, the peasant market gardens were yielding approximately 18 tonnes of tomatoes per hectare as opposed to 10 tonnes per hectare in the state farm sector. Due to the price difference between the factory and Bamako market, farmers continued to sell to private traders; as a result, SOCOMA may have received only about half of the peasant sector production (Bagayogo 1982:92). Managerial problems continued, which within the international financing climate of profit maximisation and anti-state enterprises resulted in the partial privatisation of the plant in 1978. The new mixed state/private[34] Société des Conserves Alimentaires du Mali (SOCAM) received French funding for land and factory development. In 1987, the plant was producing tamarind juice.

The Baginda cannery was, and is, only one of serval agribusiness projects in the Baginda area. From the time of the construction of the canal in the 1920s to the air-export crops of the 1980s, the state and now para-statal projects have aimed at individualised production, uncomplicated by moral economy constraints. The farmer was transformed into a producer first. Among the capitalist farmers, employing non-kin labour and residing off the farm, this reorganisation of production has completely changed the household (*du*) basis for labour organisation and land use. However, household member commodity producers who produce subsistence

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34. In a 1986 United Nations publication, SOCAM was reported to be 85% state and 15% privately owned (UNIDO 1986:68).

crops within a *du* structure continue to supply urban markets with fresh produce.

Conclusion

The social, economic, and political forces which have shaped the particular form of dryland grain production and market gardening in one village in 1987 stem from developments that are not restricted to a narrow study of farming systems on the one hand, or on the other hand to the experience of a single village isolated from regional history. Even without the details of the ancient periods, one can trace the social, economic, and political forces that have shaped contemporary Malian agriculture, while interpreting how the topic of the particular case study is woven into the broader history and geography of the region. The farming system of Soro in 1987 is not just a phenomenon explicable through an analysis of inputs and outputs. Those who are farmers have multiple identities through, e.g. kinship, reproductive relations, and commodity and subistence production. As a part of the Malian peasantry, they have a certain relationship with the state.

This chapter has focused on this relationship. I have organised the chapter to show that the colonial state took two broad approaches to the development of agriculture. One was a hands-off policy in which peasant social structures such as the productive unit *du* in Bamana society were to remain intact but that at least some of its surplus production would be shunted into state coffers through the mech-

anism of taxation. The state demanded labour too--especially during the slack agricultural season in order to minimise the disruption of the integrated labour-farming system which the state was already taxing in the fields--to build roads, railroads, canals, buildings, and other state structures. This policy of transforming the mass of the peasantry into workers benefiting the colonial state with minimal capital investment in production characterised the general approach to the entire French West African region (Amin 1972).

Subsumed in this framework for extracting from existing peasant structures, the state attempted to concentrate investment in only a few projects where production, and in this case agriculture in particular, would be completely transformed from the base structure. In the French Soudan, by far the greatest investment was directed toward irrigated agriculture in the Office du Niger project for which the Baginda section was a laboratory. New crops were introduced as well as new tools. Some of these introductions were intended as possible additions to the peasant sector, for a radical transformation of peasant production. Those implementing colonial state policy were handling technical agronomic and socio-economic problems with which they had little or no experience other than in other countries, and often they were using insufficient data on soils, hydrology, precipitation, and other physical environment characteristics.

With regard to the 'hands-off' policy, many contradictions can be found in the capital investment approach. A

structure of agricultural experts was established in schools and research stations whose advice would influence policy implementation. Their experiments were directed toward the objectives of the state--notably increased exports to compete in a growing world market of agricultural goods. The colonial expositions in Bordeaux and Paris are evidence of the need to show the worthiness of the colonial endeavour in terms of profit and 'progress' measured in terms of accumulation (cf. Delavignette 1931).

The farmers who benefited from such experiments and introductions were those who in many cases were removed from peasant structures, such as *du*-based farming. They were bureaucrats in Bamako. These individuals were granted concessions and became the early small capitalist farmers, hiring labour and selling produce to urban markets. A complex process of differentiation was occurring as the state intervened in the peasant economy. That process has continued from the colonial era to the present. One of its effects is the continued decline of the moral economy and the increase in conflict within the farming system as certain farmers benefit from state projects while others do not.

The mass of the peasantry still produce in extended family-based household units whose surplus is taxed. The farms of some, to be looked at in greater detail in the next chapter, became market-oriented with a concentration on commodity production, e.g. groundnuts and cotton. These new divisions of the peasantry into different kinds of commodity-producing farmers injects new forms of conflict

into the farming system. Farmers compete for resources (land and labour) on which to grow cash crops.

In the next chapter, I will examine the access to land and labour of different farmers. Production on different kinds of fields and separate zones of the village as defined in Chapter III has a duel subsistence and commodity orientation. As I will show in Chapters VI-VIII, farmers' access to labour and productive land are key constraints on production for individual farmers.

Chapter V.

Access to Land and Labour.

In the last two chapters, I have shown how and why farmers have dispersed over an area of land in the last one hundred years (Ch. III) and traced their on-going relationship with state power through various policies affecting agriculture (Ch. IV). This chapter focuses on farmers' access to land and labour necessary to produce crops. Individual farmers do not have equal access to land and labour resulting in an uneven productive capacity of different farming units. When those farming units are further divided according to the social status of the farmer responsible for the field (field type)--e.g. household/individual, man/woman --then a basis will be established for understanding the balance and tension between different productive activities discussed in the next three chapters.

Landholding can be understood as a spatial expression of the social relations between farmers. Bamana field types are related to the social position and power of the field heads (*forotigiw*). Chiefs, household heads, their younger brothers, mothers, wives, daughters, sons, in-laws, and other relations have social stations--subordinate, authoritarian, interdependent, and independent. They are also members of social units all of which are flexible and undergoing constant change, like the household (*du*) and youth labour group (*tòn*). These 'social units' or combinations or subdivisions of them, can also be production units.

In this chapter, I will define elements of Bamana social structure to look at the factors influencing spatial organisation and production. This 'spatial structuring' of society is '...seen not merely as an arena in which social life unfolds, but rather as a medium through which social relations are produced and reproduced.' (Gregory and Urry 1985:3) The focal point of this reproduction of social relationships is the village chief, as I will show in the first section. The institution of chieftancy unites the village, and it is through this direct descendant of the village founder (see Ch. III) that farmers gain access to land.

Production, though, is organised at the household and sub-household levels with the exception of village labour groups, and where they exist, village collective fields. The second section thus focuses on the differential access to land and labour through the households and the organisation of labour working on fields.

1. Village Level.

i. Access to land.

As I showed in Ch. III, Bamana religion plays a major role in determining concepts of land. The premises for the allocation of land begin with Bamana beliefs about the relations between persons, land, and a higher being or God. Those who use, or first clear, land seek the protection and sanction of God. The object holding the village protecting spirits (*da siri*), as I have shown in Ch. III, is a manifes-

tation of this belief. When a village is founded, the chief of the land (*dugutigi*)[1] confers with village elders to decide if it is propitious to stay and work the land. Each time a new family comes to a village, the head must approach the village council in a similar manner. Land not cultivated such as forests, hills, streams, is not held by an individual; rather it is part of village collective land.

A similar conceptualisation of African land tenure in general has been made:

> Tenure is customarily recognized as 'communal' rather than individual. Invariably in theory, and often in practice, the ultimate word in the allocation of land was that of the head of a given group--the ruler where the political system was of the order of an organized state, a territorial chief or the head of the kinship unit where the state, as defined, did not exist. The sanction was religious, going back to ancestors or deities....
> (Herskovits 1962:144)

Thus, Bamana land tenure begins with the founding family of the village who is believed to have originally settled with divine approval. With the approval of the representatives of this lineage, newcomers to a village seek access to land. For this reason, lineages that have been established in a village for the longest period tend to farm the preferred soils. As I showed in Ch. III, Lewis (1979) extended this hypothesis to the village level by proposing that older villages, at least in the Segu area, could be found on the more

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1. In some Bamana villages, a separate position of *dugukolotigi* is directly responsible for land matters; but even in these villages, all authority ultimately rests with the *dugutigi* who is senior to the *dugukolotigi*.

clayey soils on which shea (Butryospermum parkii) trees were abundant.

The way farmers gain access to land can influence social differentiation. This was the starting point for the USRDA's policies to intervene in village production as I showed in the last chapter. Since the Keïta era, land tenure relationships in Mali have been misunderstood by, and reinterpreted to meet the needs of, development planners. The USRDA began by taking some Bamana concepts of land literally, as tools for the understanding of land - peasantry relations in the post-colonial period. These concepts were based on the Bamana premise that land was not owned by individuals. This is what the USRDA called the collective appropriation of land and was the background from which it assumed that there was no land problem in Mali, and that only a labour shortage existed (Dembélé 1981:104). This assumption was a misunderstanding of the tensions of constraints on land and labour subsumed in the relations between farmers at household and sub-household levels. I will return to the USRDA policy and the current government's policy later in the thesis. Next I will show how the cermony installing a new chief emphasises his role as the focal point of village unity and land tenure relations.

ii. Chief (*dugutigi*) as focal point of land tenure.

The first family, the eldest male of which is the first chief (*dugutigi*) and from whom all successive chiefs are descended, and the eldest male representatives of accompanying

lineages decide what parcels of land they will clear and farm (cf. Sanogo 1984:7-8). Land farmed by those lineages is inherited by the next eldest male descendant of the first to clear the land. The office of the chief takes into consideration the village level collective concerns of the village. Hence, land allocation is through the chief, and mediation of land disputes, permission to settle in the village, and taxes are among the chief's responsibilities.

The relationship between Soro and the neighbouring village of Munzun[2] (Map 1.1) demonstrates the significance of lineage ties to land access even at the inter-village level. Soro and Munzun are considered fraternal villages because they were founded by brothers at approximately the same time.[3] The lineages of the two villages are so close, recognising a common ancestor in the father of the two founding brothers, that the Soro chief plays an important role in the induction of the Munzun chief. The lands of the two villages are considered the same with regard to any dispute with another village. However, access to land by household heads within the villages is administered separately by the chief (*dugutigi*) of each village. Since the induction of a chief highlights the unifying role of the position and the responsibilities of the holder (cf. Pâques 1954:61; Monteil 1924:187), I will describe the ceremony.

Three months after the death of the chief of Munzun, a

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2. Munzun is 5km east of Soro, has over twice the population, plus a school, nurse, and dispensary.

3. Soro elders claim that Soro was founded first.

new chief was named and inducted on 26 April 1987. Dignitaries and representatives from neighbouring villages were invited to attend. When the Chef de l'Arrondissement and others began arriving in the village square (*fèrè*) around 10.00 in the morning, several young men were directed to drum to announce the beginning of the ceremony. Among the crowd of several hundred were the head of the Munzun *kòmò* society (*kòmòtigi*), hunters with their rifles--many of them dating to the nineteenth century, and the women, men, and children of Munzun and many from Soro as well as other villages.

The new chief arrived with a procession amid energetic singing and dancing, and loud drumming. The crowd fell silent when the elderly man had arrived in the shade of a tree and directed its attention to him. He was assisted to sit[4] on a cowhide mat, a symbolic throne, spread beneath the tree. The hunters laid down their guns in front of him. His veiled wives sat to his right, and village elders stood behind him while others crowded around in a circle in front of him. In his right hand, the new chief held the *dugutigitama*, an iron spear kept as a symbol of office.

The new chief of Munzun was then sworn in by the younger brother of the Soro chief. The younger brother was acting on behalf of the Soro chief who was not well enough to go to Munzun that day. Sometimes holding aloft his left hand, the representative of the Soro chief asked the new

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4. *sigi* 'sit' hence the name of the ceremony *dugutigisisigi* 'the seating of the village chief'.

Munzun chief: 1) to be an honourable leader like those who had preceded him; 2) to respect and love everyone, 3) to be fair; specifically, whether he would be able to judge disputes between his family and friends, between his family and others, and between others including friends; 4) to respect the customs of the people; and 5) to be responsible for protecting the village. After the swearing in, the drummers were again directed to play.

The dignitaries, followed by hunters, and women danced in a circle. The hunters fired their rifles into the air. Not more than 45 minutes after he had arrived in the public place, the new chief was led back to the chief's compound in front of which dancing continued well into the night. In this way, the new hereditary chief of Munzun came to power. By virtue of his age, gender, and relationship to the deceased chief, he had been selected as the new village head.

Another aspect of the ceremony reaffirmed the primary position of the descendants of the founding lineage. Two cows were killed for the occasion of the induction, as is customarily done. The first, called *dunan fanan misi*[5] 'beef for invited foreigners', is eaten by all the guests. The second, called *yèrèwolo misi*[6] 'beef for the chief's family', is eaten solely by the family of the chief. The head of the *yèrèwolo misi* is reserved for those family members ab-

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5. *dunan* is a foreigner to the village; the Kulubali of Soro are not *dunan* in Munzun. *fanan* is food given to invited guests. *misi* means cow.

6. *yèrèwolo* is a noble, a direct line descendant of the *dugutigi* and therefore one who can become a *dugutigi*.

solutely sure of the legitimacy of their birth.

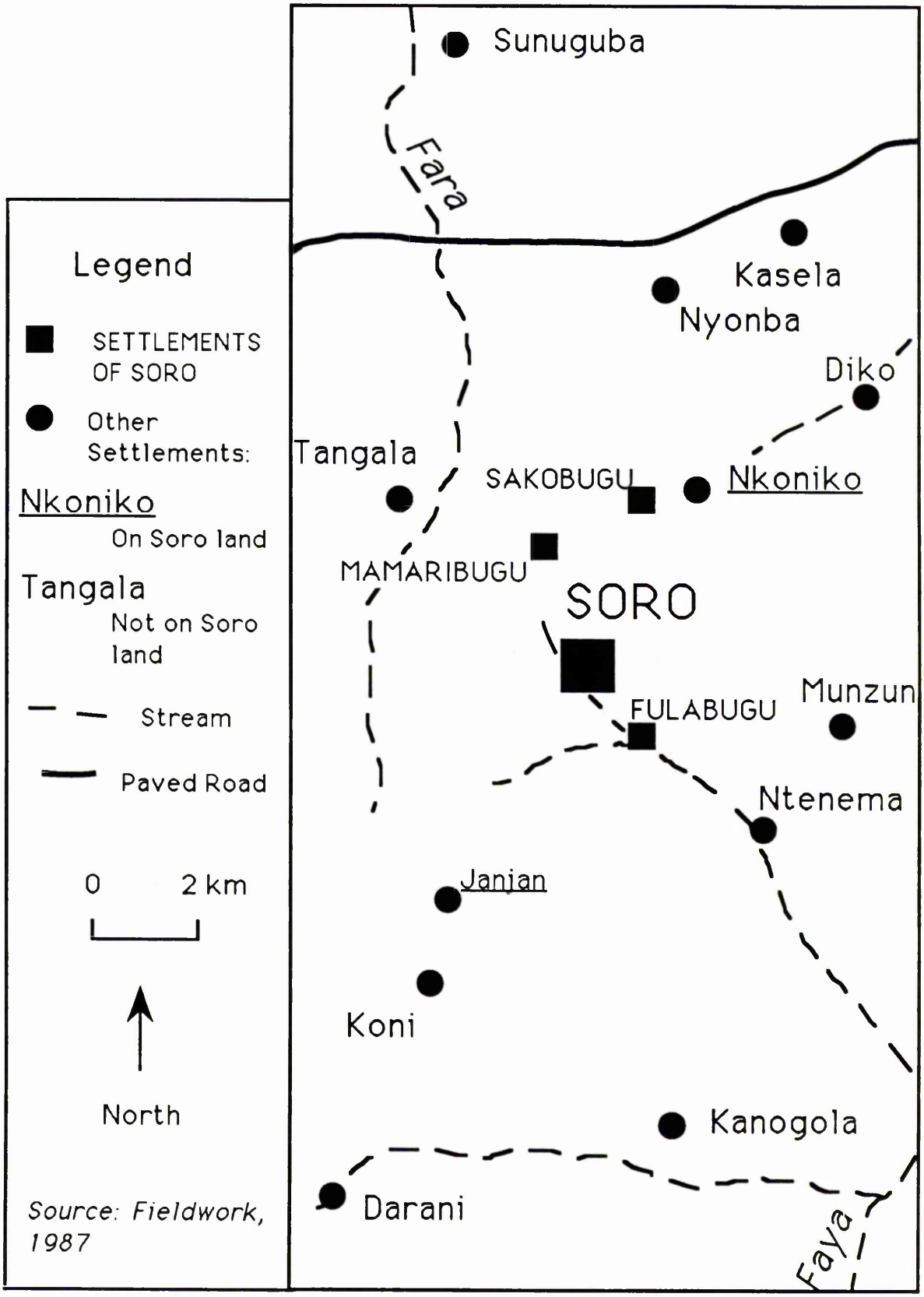
The chief is thus the focal point of the social structure. The patrilineal descent line through which the office is transferred sets the model for inheritance patterns in each compound (*du*) within a village. The office of the chief centralises the allocation of land to the compound production units, which have been and in most cases still are the largest (See Ch. VII).

iii. Chief as protector of village land.

Since Soro and Munzun were already established when the regional population began growing after the nineteenth century wars, new communities like Nkòniko and Janjan (Map 5.1) have settled on what has historically been 'their' land. Village land boundaries have not been surveyed and are not fixed on maps. As a result, obtaining a precise measure of the extent of village land is difficult. The Soro leaders lay claim to a very large territory: the Faya stream in the south and the Fara stream in the southwest, and the villages of Nyonba to the northeast and Sunuguba to the north (Map 5.1). Nkòniko and Janjan are said to be on Soro land even though they are administered separately, and as I have shown, Soro and Munzun are considered the same for the purpose of external relations.

One Soro informant claimed that Nkòniko and Janjan are currently taxed independently, but that they have no real chiefs (*dugutigiw*). Another said that they do in fact have chiefs, but that in the case of Nkòniko--settled by people

MAP 5.1 Soro's Land Claim



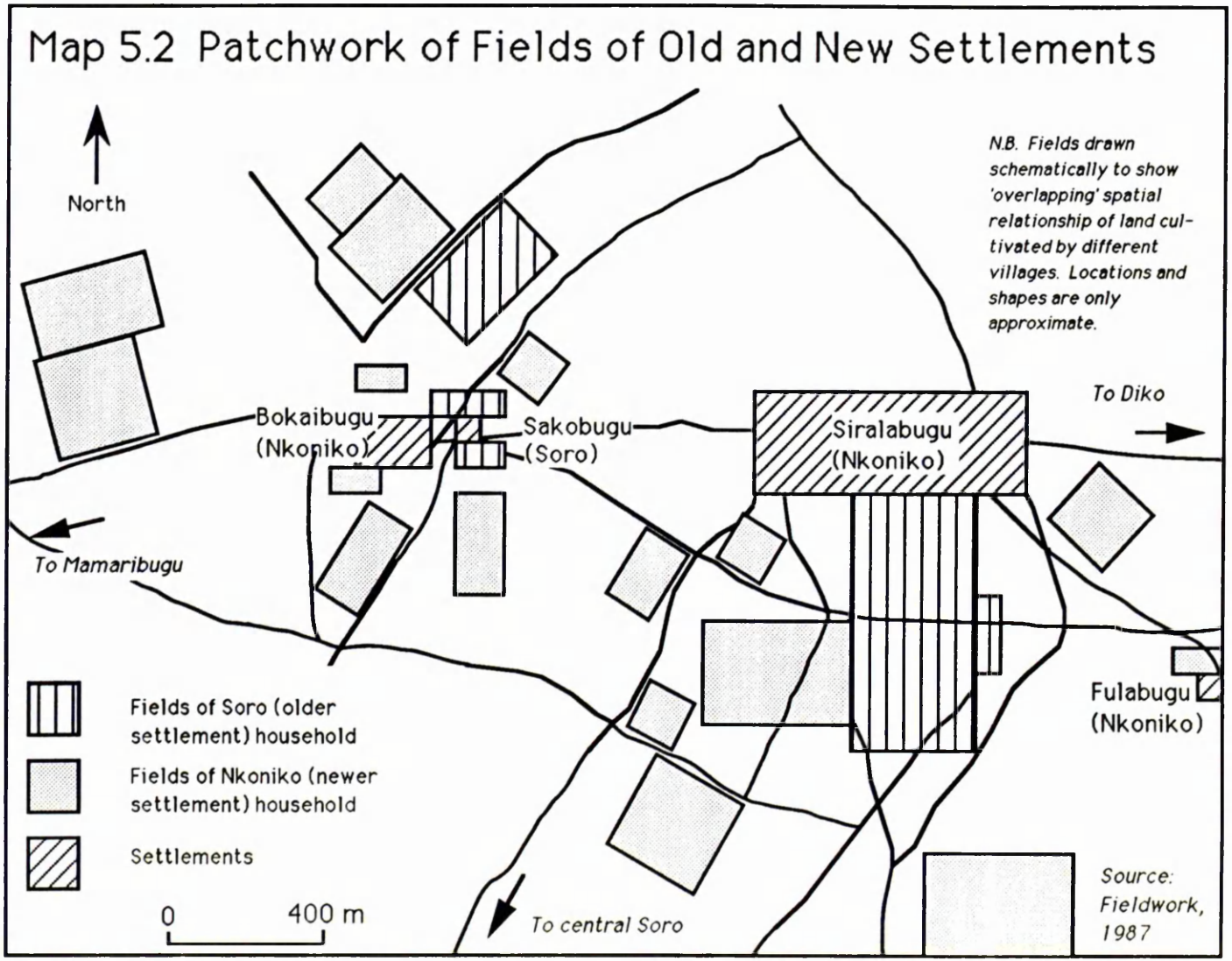
from Dara (Map 1.1) where a land shortage had restricted access--the village is still on Soro soil (*dugukolo*) and that new settlers from outside must still seek the approval of the Soro chief. In the past, the first residents of these communities sought the authorisation of the Soro chief to settle in their current locations. Kòni, Tangala, and Diko are not on Soro land.

The boundaries in one section were fixed following a heated dispute with a neighbouring village. The dispute provides an example of the role of the chief in overseeing land disputes for the protection of the people of his village, at the same time that it shows the ultimate subordination of customary law to the laws of the state. According to a document preserved by the Soro chief (Cercle... 1951), Kòni farmers began farming land east of Bila *kò* (stream south of Ntenema but not indicated on Map 5.1) in the late-1940s. The Munzun chief protested that this was Munzun (and therefore Soro) land. The dispute lasted three years and shots were fired.

Munzun took the case to court in Bamako. One current Soro resident remembered going to Bamako for the case. The tribunal, taking place through Bamana interpreters named in the four page document, decided in favour of Munzun. They cited laws from the 1930s and first decade of the 1900s. In the end, Soro informants said, Kòni had to pay 1300 francs to the colonial government. The boundary was set along the Bila kò: to the east of the streambed was Munzun land, to the west Kòni.

In contrast to this singular example of hostilities between villages relating to land, peaceful land borrowing arrangements are common. Land borrowing is necessary because of local land shortages. Borrowing can lead to a tenureship 'patchwork of fields' (Teme 1985:162-3) in some places, as in the scattering of Nkòniko and Tangala fields among Soro fields on Soro land. In the case of Nkòniko, a relatively recent village formed since Soro was founded in the nineteenth century, the fields of Soro Households IV and VII are closer to Nkòniko houses than to the centre of Soro (Map 5.2). Nkòniko's centre and its four hamlets are situated in the upper reaches of a drainage basin shared by Sakobugu. Contiguous with the Nkòniko centre is the household field (*forobaforo*) of a central Soro household (IV). Sakobugu and its household (VI) field are now completely surrounded by Nkòniko fields except for a small stretch of fallow land and regenerated bush. Many Nkòniko residents live closer to the Soro household field (IV) than they do to their own. These Soro workers must travel the 4.5 km to their bush field, and women carry water and food out, even though their field abuts on the back of Nkòniko houses.

Where the fields of two villages have grown together, the concentric ring model does not seem to apply to village-field space. There is no bush buffer space between the two Soro fields and those of Nkòniko. The cause of the patchwork is the historical land tenure relations of the area and growing populations. Soro lineages were established before Nkòniko existed. If population in the basin continues to


Map 5.2 Patchwork of Fields of Old and New Settlements
North
N.B. Fields drawn schematically to show 'overlapping' spatial relationship of land cultivated by different villages. Locations and shapes are only approximate.
To Diko
Bokaibugu (Nkoniko)
Sakobugu (Soro)
Siralabugu (Nkoniko)
To Mamaribugu
Fulabugu (Nkoniko)
Fields of Soro (older settlement) household
Fields of Nkoniko (newer settlement) household
Settlements
0
400 m
To central Soro
Source: Fieldwork, 1987

grow, soon there will be no more land for extending cultivation. The earliest occupants of the land, the Soro households, are already nearly encircled.

Soro is not solely a land-lending village. Many of its farmers enter into seasonal land borrowing arrangements with farmers from the villages of Kòni and Darani to obtain access to the coveted lowlands along the Faya stream in the area known as Kanògòla (Maps 1.1, 5.1, 6.1, 8.1) where dry season well-irrigated farming has mushroomed. A crucial test for the concentric circle model is, then, access to the kind of land resources necessary to meet the agro-ecological requirements of the crops demanded in the farming system.

When Soro farmers obtain a Kanògòla parcel (usufructory rights) for tomato growing, a Soro farmer must approach a Darani personal field head (*jònforotigi*) who in theory seeks or has the sanction of the chief of her/his village. The only condition for borrowing the land is to fertilise with manure and nitrogen-phosphate-potassium (NPK), and that the land is vacated in the wet season in time for the *jònforotigi* to plant rainfed millet/sorghum. The area collectively called Kanògòla where Soro farmers grow tomatoes alongside farmers from other nearby villages is fenced. Within the same enclosed plot, 10-15 gardeners could be found borrowing land from the same *jònforotigi*.

From these examples of inter-village land relations, we can see how the chief is responsible for protecting the interests of his village. Even when the chief cannot perform the responsibilities of his office in person he delegates a

younger brother or son to be responsible. The chief plays a major role in the Bamana farming system in reducing conflict. When hostilities developed, the chief appealed to a higher authority, but in the more common situation, land-lending and borrowing is sanctioned and mediated through the chief. As access to land becomes more constrained by population growth, this mediating role will become more important. Whether the political system of accession based on a patrilineal gerontocracy will assure successful land management practices and the mediation of land disputes is questionable.

In the next section, the focus turns to farmers' access to land at the household level.

2. Household Level.

Despite past and current efforts to encourage village level productive crop land such as collective fields, most agricultural land is held at the household level. At this level, land is held by the head of a lineage who is responsible for the reproduction of the group; the lineage head is, in this sense, 'the guardian of his heritage of tenureship'[7] and not the 'owner' of alienable land (Verdier 1986: 12). Rights to land are best understood as use rights, rather than ownership. Indeed, in customary law, rights are held not in relation to land but in relation to other persons with respect to a plot of land (Parsons 1971:16); hence

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7. *'le gardien de son patrimoine foncier'* (Verdier 1986:12)

the difficulty I had in seeking to define the territory of Soro until I found an example where the land was defined in relation to rights in opposition to the people of Kòni.

Defining the household, as well as the production unit, is essential to the understanding of West African agriculture (Richards 1983, Ancey 1983, Watts 1983, Billaz & Diawara 1981). In Ch. I, I showed the importance of considering the forming of household and sub-household level labour groups as a process, rather than identifying fixed farm units. Having discussed the role of the chief in unifying the village community especially with regard to land matters, the following two sub-sections outline different ways of considering groups at the household and sub-household levels. In the first sub-section, I briefly discuss collective activities that play a role in group formation, and in the second sub-section I focus on the definitions of production groups.

i. Defining social units by collective activity.

The chief (*dugutigi*) allocates land to heads of families, designated most commonly as *dutigiw*. These farm heads are eldest male members of their respective households.[8] As the head of the *du*, the *dutigi* has authority

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8. In the past, some anthropologists have indicated the central authority as the *fa* 'father' (Labouret 1934:556; Monteil 1924:158, 173-185). Social scientists today have used *du* and/or *ga* to indicate the household and central production unit: Cf. Turrittin 1987:123-156 [*du*]; Toulmin 1985:21 [*gwa*]; Bagayogo 1982:174-5 [*du* or *gwa*]; Lewis 1979 [*du*]; Jones 1976:279 [*lu*]; Hopkins 1972:36 [household].

over the compound level goods, including production, labour, land, tools, other property, and use rights. This is the common ownership (*foroba*) of the *du*; the *du* is the basic production unit of the village (Ernst 1976:55).

Distinguishing between residential, consumption/eating, accumulation/stocking/investing, and production/working units is essential to social science research in West African peasant societies (Billaz and Diawara 1981). The confusion over defining these groups is related to the general problems of defining the household discussed in Ch. I. The groups do not necessarily coincide; they are subdivided; and linked to one another. I will briefly examine residential, consumption, and accumulation groups before looking in more detail at the centres of production in the process of organising labour.

Residential groups are those residing together in a cluster of houses either enclosed by a common wall or in close proximity often facing in towards a common space, or courtyard (*fèrè*) (See Ch. III, Fig. 3.1). This cluster of houses is the compound. The residential group may have its land as a result of its lineage history in that village, but this group may also include non-lineage members. Historically, non-lineage members included slaves (*jònw*). In 1987, in Soro, non-lineage members of residential groups included Qur'anic students, herders, 'visitors' working in the area, and workers (*baaradenw*) who had established a short or long term relationship with their hosts (*jatigiw*).

Consumption units, persons dependent upon a common gra-

nary, may be the same as the residential unit throughout the year or for part of the year, or they may only be sub-units of the residential unit. In Ch. I, I made reference to Goody's (1958) work showing that the formation of separate cooking groups[9] within a residential unit may be a source of conflict within the larger household production group. The formation of separate consumption units foreshadows household fission.

One of the Bamana words for head of household emphasises the importance of unifying the cooking units: *gatigi* (*ga* = kitchen, hearth; *-tigi* = head of, one responsible for). The *gatigi* can designate a head of all the kitchens (*gaw*) in the compound.[10] Lewis (1979:35) states that this is the preferred situation in a well functioning Bamana compound, and that therefore the *dutigi* and *gatigi* are the same person, the head of the compound, household labour force, and household field. Only where fissioning has begun, are there separate *gaw* beneath the *dutigi*.

Caution must be used in equating the Bamana word *ga* 'kitchen, hearth' with consumption unit. A *gatigi* may, therefore, be defined as the male head of those dependent on a common kitchen. This definition is not always valid. In the Wèlèsèbugu area, the *gatigi*, while often the same as the

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9. A cooking group--eating from a common kitchen--is slightly different from a consumption group, but the two are considered together here.

10. This word is often pronounced *gwa*. The spelling I use here follows the decision to exclude the *w* following *g* for standardisation (DNAFLA 1979:12, 17)

dutigi, could refer to a position subordinate to the *dutigi*. If considered the head of a sub-unit of the compound eating out of a separate kitchen, then the *gatigi* would be subordinate to the *dutigi*.

The groups that actually eat meals together out of the same dish can also reflect compound harmony. Usually they divide along gender lines, with adult women eating together, and adult men eating together. In larger compounds, married women establish a food preparation rotation. They distribute the prepared food to the different eating groups. Changes in the eating groups for reasons other than health or travel may signal disunity and conflict in the group.

Persons who stock or invest together (accumulation groups) are complex and variable. They are especially related to production groups, discussed below with field types and the focus of this study. The granaries of the *du* are the most obvious sign of stocking in a compound. These are managed by the *dutigi* to meet the subsistence needs of the compound members. In addition, livestock are an important investment, and thus a part of accumulation at the level of the household and individuals.

Individuals within households derive incomes which meet a wide variety of investment and consumptive needs. Gender plays an important role in their ability to do so. Women need to provide the sauce ingredients for household cooking, and clothes and other necessities for their children. Men, on the other hand, often have more freedom to cover medical and marriage expenses, as well as to invest in transporta-

tion (bicycle, moped) and miscellaneous other goods (e.g. tea, radio, batteries, meat, and shotgun cartridges). Women often must produce, either directly in their fields or gardens, the sauce condiments, or indirectly by earning cash to purchase sauce ingredients. This sauce expense (*nasòngò*) can be substantial.[11] The ability to invest or stock thus reflects the capacity to produce.

The groups that form to produce food for household members and/or goods that can be sold for cash (commodities) are the most important in farming systems analysis. These groups have been defined according to particular cultures. Ancey (1983) identifies four groups in Mossi society with reference to male lineage members:

Group 1: Farm head, his wives, their unmarried children.
Group 2: Married sons of the farm head, their wives, their unmarried children.
Group 3: Younger brothers of the farm head, their wives, their unmarried children.
Group 4: Unmarried brothers of the farm head and other relations of the farm head, e.g. sisters, elders.

Each of these groups has access to land and thus can form production units. The Ancey classification portrays the women household members as subordinate, a social hierarchy which does not accurately depict intra-compound Bamana access to land. The married women of Groups 1, 2, and 3 may farm their own fields in some circumstances. Their sons,

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11. Lewis recorded women in Dukolomba spending 150-1000 Malian francs per week on sauce condiments (1979:300).

but not their husbands, worked in these fields.[12] As will become evident in the next section, it is theoretically possible that competition between husbands and wives for the labour of their children in their respective individual fields could add to intra-household conflict. The next subsection focuses on the social units organised in Bamana society for production.

ii. Defining social units by relationship to the head of the household.

The head of household, as I have shown, plays a key role in the organisation of Bamana society. That role is also very important in the farming system. From the village chief, the household head has access to land, and through the history of his own lineage's domestic cycle (Chayanov 1966) household labour has been reproduced. Within the household, the organisation of farming takes a myriad of forms. To understand this process of transforming land through the organisation of household labour, the constant change and adaptation of land-labour relations within peasant farming systems must be seen as part of the process of social reproduction.

In this section, Pred's (1984) notion of 'place as historically contingent process' is useful in understanding the dynamic and multi-centred structure of production. Through the daily action of individuals, social structure is repro-

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12. In a study based on fieldwork south of Segu, Turrittin (1987) found husbands working in the fields of their wives.

duced--specifically including the spatial and social division of labour--and nature is continually transformed by humans. Pred took the example of the intersecting actions of individuals in a certain location, such as the creation and reproduction of labour division each time a parcel of land is cultivated:

> Such a division of labor is not possible without allocative and role-assignment decisions being made by...some...power-holding individual or group within the institution that controls the particular piece of land. Those decisions, moreover, are not entirely spontaneous. They are based on the practical knowledge, situation-specific information, and the ideology (values, beliefs, and ideas) or cosmology held by the decision-makers....(1984:283)

Pred's emphasis on the 'allocative and role-assignment decisions...by some power-holding individual or group' draws attention to the question of the kind of balance between production groups with access to land. The apparent 'complementarity' of field types in this social sense will be questioned. Indeed, when the land tenure system and the unequal access to labour within the household are considered together, the suppressed conflict of intra-household relations becomes more evident. If 'male-female roles were *complementary* and *cooperative*' (Watts 1983:117-8) in the moral economy of the nineteenth century *gandu*, then, I would argue, it did not result from a passive sharing of tasks but from the structural division of labour within Hausa society. With regard to earnings from their respective fields, Guyer (1984:110) questioned the complementarity of men's and

women's fields. As new expenses and pressures impinge on household relations, the question arises, 'Who pays for what?' When, how, and why must also be asked, drawing into the investigation the nature of the land tenure system and the negotiation over access to land and labour.

In the Bamana farming system, a farmer's access to land and labour is determined largely by his or her structural position in the household, as well as the demographic characteristics of the household, and the less tangible amicability of relations between household members. By focusing on social units in relation to the head of the household through whom access to land is obtained and access to labour determined, some of the land and labour constraints on production groups become evident. For each group identified in Soro, I will emphasise access to land and labour, responsibilities to household (and non-household) members, and the field type where the production group grew crops. The land and labour qualities of a field type, from the evidence in Soro, were essential to the basis for a production group, and therefore to understanding the production process.

a. Household head.

Although the household heads (*dutigiw* and *gatigiw*) have already been discussed in relation to residential, consumption and accumulation groups, their role in production is fundamental to the formation of the other groups since it is through subsistence production on household fields that food

supply and other communal necessities are assured.

The household head gains access to land through the village chief. Each *du* establishes its land use rights through time. Brasseur recounted a Bamana explanation for land use rights: *'Moko sigui yoro koro, moko ka tije da yoro koro, yi taye.'* (1961:637; Brasseur's transcription), which means 'the place where one has settled in the past and where one has farmed, that is one's own'. Since Bamana society is patrilinear and patriarchal, the *dutigi* position is usually taken by a man. When a *dutigi* dies, succession is to the next eldest male descendant who then becomes responsible for the collective household belongings including the *foroba-foro*. This inheritance is explained in Bamana by the notion of *fabonda* 'father's family responsibilities', or in more general terms as a patrilineal succession. This model of succession has many exceptions.

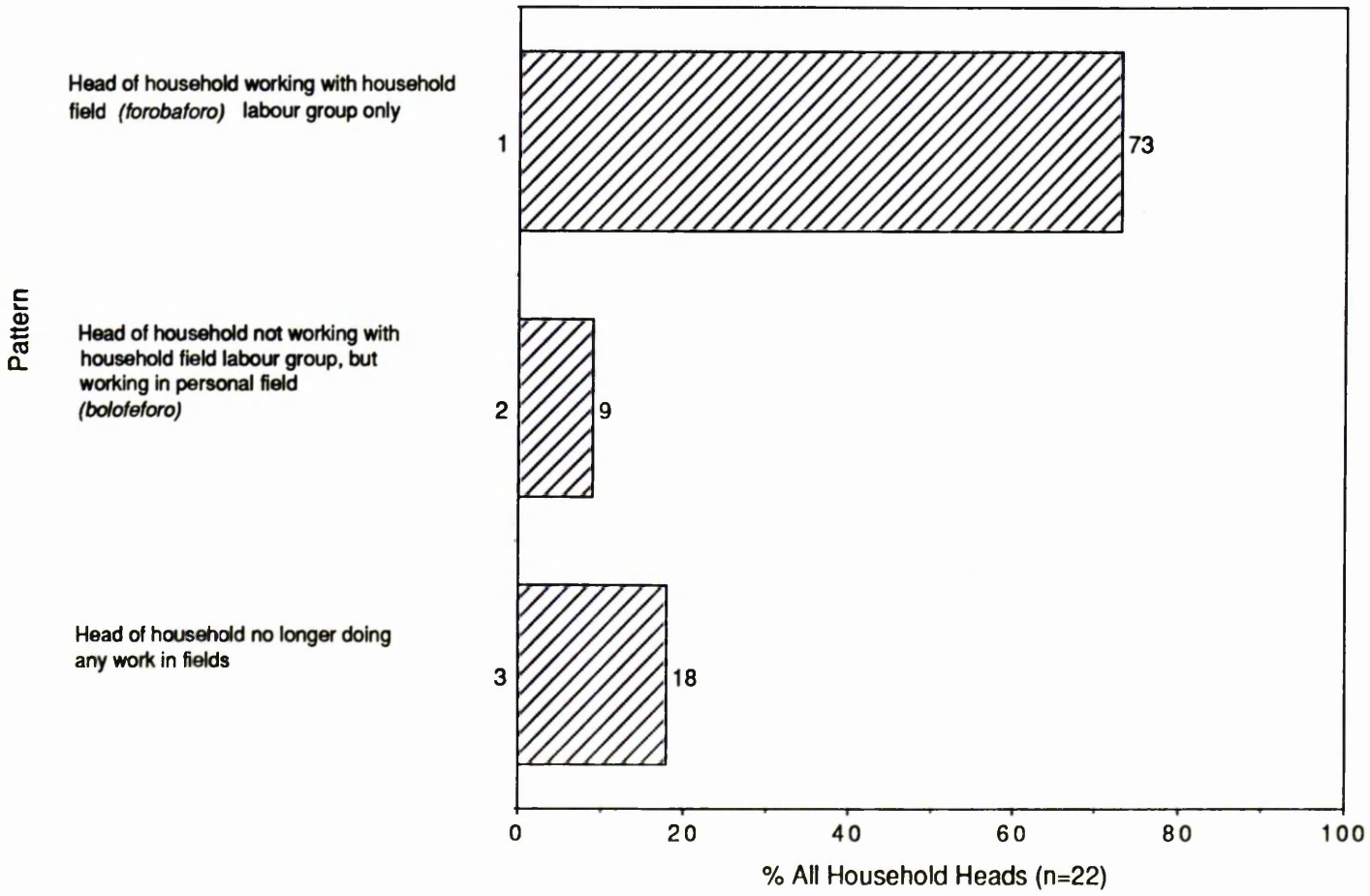
The *dutigi* may, at a first glance, be considered a farm manager. By virtue of his lineage relationship to an ancestor who received land from the chief, he has land and is responsible for *du*-level production. Due to physical disability he may delegate the carrying out of this responsibility to another member of the *du*. Part of the *dutigi*'s responsibility is thus recruiting the labour necessary to meet his production goals. The immediate pool for this labour is found within the *du* itself, that is, especially the *dutigi*'s wives and children, his brothers, their wives, and their children. Beyond the relatives, other dependents or employees may work for the *dutigi*. The land or field

unit where this group works together is called the *forobaforo* (See Appendix C). There, they grow dryland grains and pulses which will be discussed in detail in Ch VII.

The product of the *forobaforo* is under the authority of the *dutigi* and kept in a *forobaforo* granary. The *dutigi* is ultimately responsible for management decisions relating to the *forobaforo*, such as when to plant a certain crop and where, but when he is no longer able to go out to the field due to his age or health, he delegates the agronomic decision-making to a field worker, usually the eldest male (cf. Koné et al. 1983:19; Lewis 1979:42-3; Ernst 1976:55; Jones 1976:281; Diallo 1973:18; Monteil 1924:178, 183; Delafosse 1911 [1972]:22).

In Figure 5.1, the three patterns of household head field work and management in Soro show that most (73%) *dutigiw* work in the *forobaforo* with the other members of the household labour group but not in any other production unit. Two physically fit household heads from large households--over forty persons--(See Appendix F) worked in their own personal fields only, while the household labour group under their authority grew crops in the *forobaforo*. These *dutigiw* were said to have 'retired' from the household field work group. Because their household labour groups were large enough to produce a harvest sufficient to meet the goals of the *dutigi* (food supply for the year for the household members, except for Household XIV which only aimed to grow enough food to feed members for 4-5 months), they could afford to leave the household field. Four household heads no

Figure 5.1 Patterns of Field Work and Management by Household Head



Source: Fieldwork, 1987

longer worked for health reasons.

The structure of a household affected the potential labour that a *dutigi* could recruit from within it. The majority (72.2%) of the Soro population lived in complex household units, which included either fraternal *du* in which married brothers of the household head lived in the same compound and worked the field (*forobaforo*) of their elder brother, or paternal *du* in which married sons worked in the field of their father (Table 5.1). The rest of the village population (27.8%) lived in simple households, nuclear families, split-off lineage segments, or multiple generation households with only one married male. Over half of the households in Soro (55.9%) were comprised of these simple household units.

Table 5.1

Population of Soro Household Units.

Household Type	(n)	Avg. Size	Total Persons	% of Tot. Vil. Pop.
Paternal *du*[1]	(6)	32.0	192	44.5
Fraternal *du*[2]	(4)	29.7	119	27.6
Total Complex Household	(10)	31.1	311	72.2
Simple	(12)	10.0	120	27.8
Totals	(22)	19.6	431	100.0

[1] Married son of farm head working in *forobaforo*.
[2] Married brother of farm head working in *forobaforo*.

Compared with Watts' table of *gandu* in Kaita, Nigeria (1983:402), a higher proportion of Soro's population lived

in complex households. The table shows the great difference (three fold) in the size of households of complex and simple structure. The figures strengthen the assertion that Soro village is politically and socially unified, if somewhat individualised in economic terms.[13]

The composition of Soro households and fields is represented in Figure 5.2. In Section A, the 22 household field units are divided into three types: paternal (father and married sons working together), fraternal (married brothers working together), and simple (only husband, wife, and children working together). The simple structure is the most common, representing just over half the households. Household fields together comprise, though, only 17% of all field types. The rest are under the tenureship of subdivisions of the households.

While, as I will show in Chapter VII, the household fields dominated total area cultivated, the personal fields types listed in Section B of Fig. 5.2 are most numerous (83% of all fields) (Section C, Fig. 5.2). Included in my figures for household field (*forobaforo*) land are those nuclear families separated from extended families farming separately. With reference to the coding of farm production Units (Appendix F), representatives of Households V, VI, X, XI, XVI, and XVII sometimes were unsure of how to designate their fields, or insisted that *'forobaforo tè'* 'There is no

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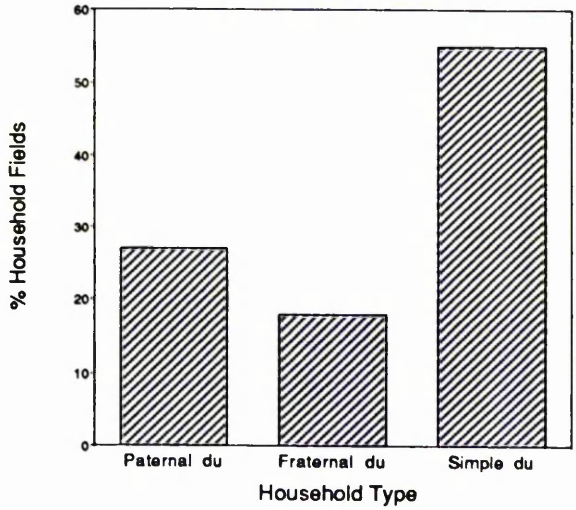
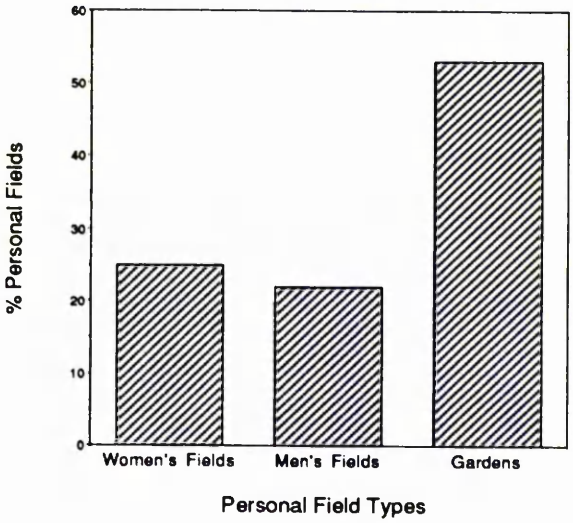
13. This assertion was made by Baginda and Bamako-based Malians experienced in rural conditions who knew Soro from experience or through our description.

Fig. 5.2 Field Types as a Percent of All Fields

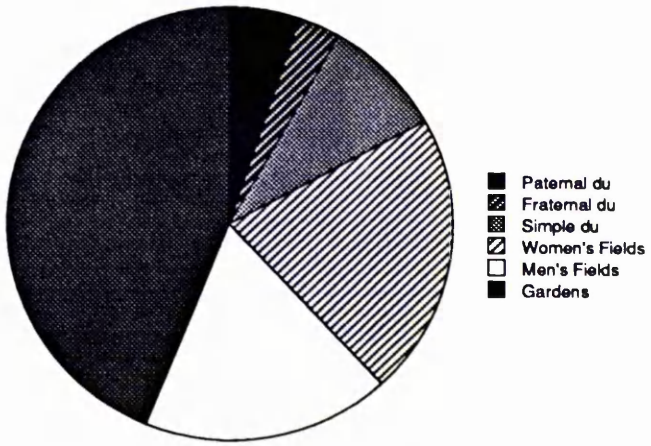
A. Household Fields



B. Personal Fields



C. All Field Units



Source: Fieldwork, 1987

forobaforo.'. These households, while still living in spatially adjacent houses, are farming separately and thus are likely to have had relatively recent splits.

In Soro, households used the produce of the *forobaforo* to support the feeding, clothing, tax payment, wedding expenses of sons, and miscellaneous expenses of the corporate *du* unit. Interviews in Soro highlighted the food for consumption orientation of the product (Table 5.2). In the interviews from which the data were collected for Table 5.2, the comment *balo dòròn* 'only food [meaning for consumption]' characterised the responses to the question about the destination of the product.

Table 5.2

Uses of Household Farm Product[1].

Household (*du*) Consumption	Pay Tax	Marriage Expenses	Sell Grain to Buy Household Goods
22 (100%)	3 (15%)	7 (35%)	Buy food 5 (25%), cattle, children's clothing, hoe (10%); cart, plough, tractor, donkey, gun (5%).

[1] Interview question 9 was the main source of this data collected in interviews of May 1987. Includes stated information only. n = 20, except for the *du* food consumption figure. See Appendix--Pre-Season Interviews--for complete interview questions and context.

Similar household farm product orientations have been reported elsewhere in Mali (Koné et al. 1983:19). In a study of household grain and livestock marketing in a region 40 km south of Segu with agricultural characteristics

similar to those of Soro, the results produced a similar picture of household production: little grain or cowpea enters the market, and sales were mostly for purchases of consumer goods, but also for payment of taxes, and financing of ceremonies (Coulibaly 1985).

In summary, the *dutigi* 'household head' has access to land through his lineage which has received land through the institution of *dugutigi* 'village chief'. The *dutigi* is responsible for assuring the feeding, clothing, and shelter of his household members who may include persons not related to the lineage. He also secures all or part of the *furunafolo* 'dowry' expenses for the marriage of his sons. In this way, household farming, as Lewis (1979) has shown, has 'twin poles of production': crops and descendants. The actual production capacity of a household will depend on the number and comraderie of household members and their fitness for farm work. The household head may work on a field by himself, no longer working in the household field tended by younger household members. This kind of individual field will be discussed in the next sub-section.

b. Other married men.

Married men besides the head of the household--younger brothers, sons, nephews, grandsons, grandnephews--had access to land through the head of the household. Access to such 'individual' fields is through one's ties to the lineage group; a relationship that thus stresses the complementarity of group and individual tenureship (Verdier 1986:11). Since

the leverage to recruit labour and the household responsibilities of different farmers vary, I have subdivided the individual field heads into married and unmarried men, married and unmarried women, and non-lineage members. These are the production units which are subsidiary to the household.

The non-household head married men usually worked in the household field for the head of the household, but not during certain periods: if daily, at dawn and at the end of the day; if weekly, on specified days; and in senior age, with agreement to 'retire' from household work. The land they worked on their own time can collectively be called individual field (*jònforo*) land.[14] In Soro, some farmers seemed to want to avoid any of the connotations of *jòn* 'slave' and preferred to call the individual fields *bolofèforow*.[15] Using *jònforo* and *bolofèforo* to designate individual or sub-household level field land, I will take a broad definition to include all non-household, personal agricultural land: gardens (*nakòw*), elder's fields, children's fields, and the fields of agnates (cf. Koné et al.

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14. *jòn* 'slave; individual': the *jònforo* was a slave's field in Maraka plantations in the nineteenth century (Roberts). Others consider the broader interpretation more applicable to today's circumstances. The individual is a slave of God in Bamana belief, a nuance recognised in Dumestre's dictionary entry for *jòn*. The field unit is the land of agnates who could be considered the slaves of the *dutigi* in the gerontocracy (Oral communication, Bagayogo, 1988; cf. Meillassoux)

15. In the village near Wèlèsèbugu, one farmer used another version, *buloseforo*. For a complete list of field names and their meanings and connotations see the Appendix C.

1983:19-21, Jones 1976: 281-2, Ernst 1976:55)(See Appendix C for a glossary of Field Names).

The term used by Koné et al. is an apt description of the heads of individual fields: *kòfèmaw* 'the people in the rear' (1983:20). The time worked on individual fields is generally after working the household field. During the agricultural season, household field work hours are usually in the morning until mid-afternoon. The remaining hours--very early morning or late afternoon and evening--may be used in non-*forobaforo* production. Later in life, also, certain individuals may be able to retire from household field labour to devote all their efforts to their own enterprises while still eating out of the common household granary.

The 'after-hours' character of individual fields is emphasised in studies from Beledugu and Segu where attention is drawn to *suraforo* 'night field' (Koné et al. 1983:20-21; Lewis 1979:122). Any individual who is not a *forobaforotigi* or a *jònforotigi*[16] may farm her/his own *suraforo* outside the time required on the household field and the field of one's mother, father, husband, or older brother (Koné et al. 1983: 20). Lewis distinguishes between *jònforow* and *suraforow* differently:

> Those male private fields which begin to be cultivated when households in a compound begin taking their meals from separate hearths are not called *jònforow*, 'slave fields'--the name for all private property although people admit that this is their correct name. Rather they are

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16. The suffix *-tigi* means 'head of' or 'responsible for'.

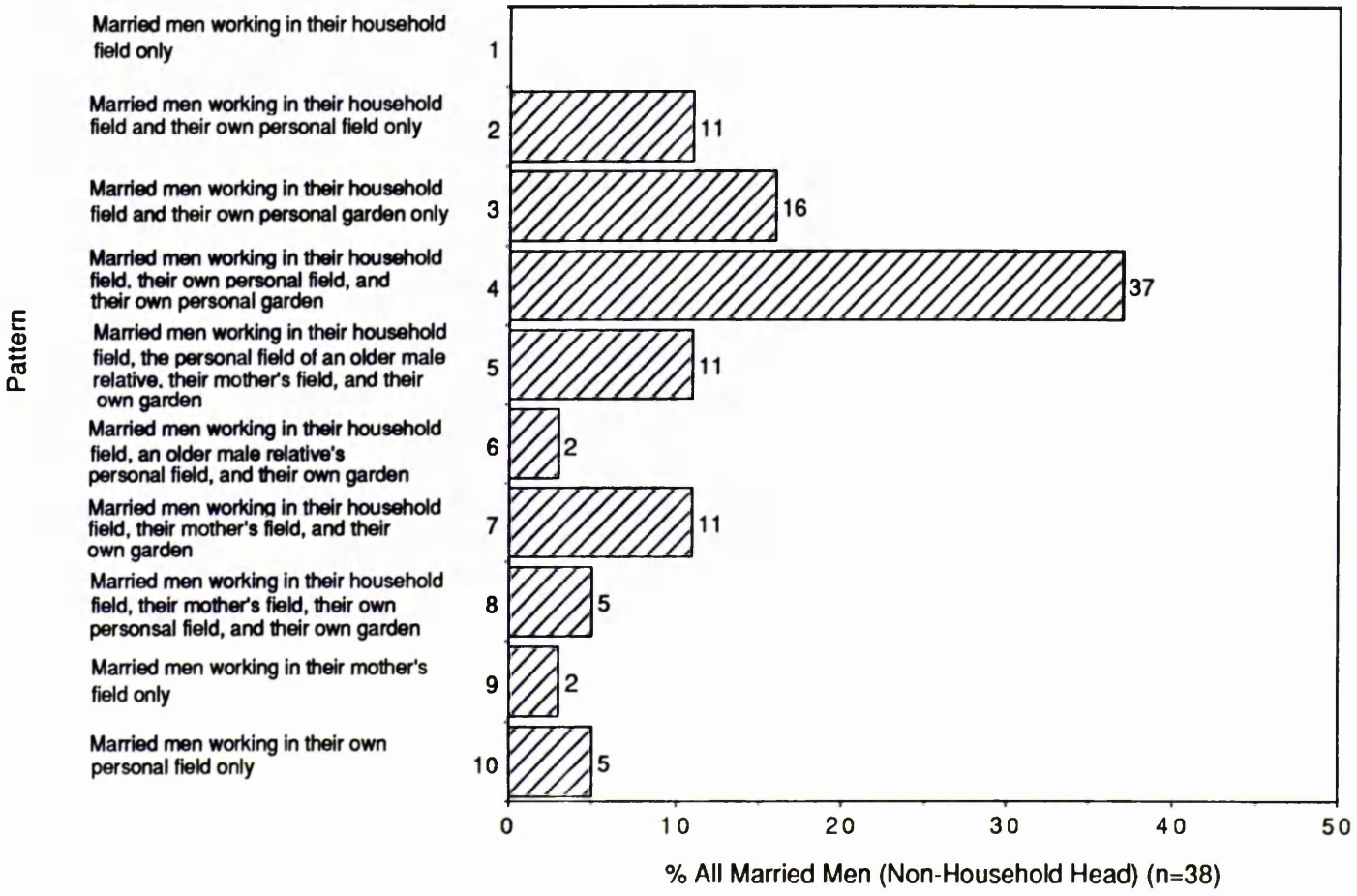
> called *suraforow* 'night fields', referring to the limited amount of evening time which a male compound junior should devote to such a field. (1979:126-7)

These non-*dutigi* stations in the social structure are subordinate to the head of the household who determines, at least in principle, who should work in the household field at a given time. Of course women and junior men in a household may have their own ideas of how to spend their time. In Soro, we witnessed two young men leave their respective households at the height of the labour-demanding weeding period to seek employment in Bamako or on the coast.

Married men who were not household heads had a wide variety of work and field management patterns compared to household heads. In Figure 5.3, I have summarised the patterns prevalent in Soro in 1987. With only one exception, all 38 non-household head married men in Soro managed their own personal farm (dryland grain field and/or market garden). The one exception was a blind man who only worked in his mother's field. All but two (5%) of the non-household head married men worked in household fields (*forobaforow*). One of these two was a herder and therefore had a special, non-lineage, relationship with the village, and the other was the younger brother of the household head who had retired from the household field labour group (Household IV).

Most farmers (63%)--patterns 2, 3, and 4 combined from Figure 5.3--in this category worked with the household labour group of their own household in the *forobaforo*, as well as working in and managing their own personal dryland

Figure 5.3 Patterns of Field Work and Management by Married Men (Non-Household Head)



Source: Fieldwork, 1987

grain field, and/or their own personal market garden. Other married men, however, combined not only working with the household labour group and managing their own personal farm, but contributed their own labour to the personal fields of their mothers and/or an older male relative. 29% of the married men worked in the fields of their mothers at least once during the 1987 season. A little less than half that number (13%) worked on the fields of an older male relative.

Considering these diverse, criss-crossing work responsibilities of non-household married men, the heads of the field types where they worked represent different production centres to which they are responsibile for contributing their labour. In addition, they are themselves the heads of production units: their personal fields (*jònforow* or *bolofèforow*) and market gardens (*nakòw*). The constant adjustment of production relationships is made at this level. Who is working for whom? Fields--which are at once locations of production, of social group unification and/or division, and, as will be emphasised in Chapters VII and VIII, agro-ecological relationships--are 'historically contingent'.

c. Married women.

While household field allocation follows the principle of *fabonda*, the allocation of individual fields is best described by *babonda* 'mother's family'. A woman gains access to land through the head of the household when she marries. Like married men, she is usually responsible for working in

the household field, but the duration of this responsibility is an important difference and takes into consideration the many responsibilities of women to the household besides the sowing, weeding, and harvesting of farm work.

In Soro, women generally worked in the household field until their first son married, at which time they would retire from the household field to work exclusively for herself and her children. The field of a retired woman was called an elder woman's field (*musokòròbaforo*) in Soro. Turrittin (1987) defined a *musokòròba* as a post-menopausal woman. The age period of menopause and the marrying of a first son would overlap in some circumstances. The productive implications of a son marrying are more important to the discussion of field/land allocation since it means that a woman can retire from the household field to farm her own field exclusively and a new household member enters the labour force. While the observation that menopause and retirement may correspond in some cases, the word *musokòròba* is usually understood and used as a term of respect to designate any older woman without reference to her reproductive or productive status.

The possession of a mother's field is inherited by her eldest son. In Household IX, an elder woman decided to stop farming her grain field after the 1986 season. The land was first offered to her son, who already had as much land as he and his wife and sons could work. The land was then made available to the sons of the co-wives of the woman ceding the field.[17] Toulmin noted that retired women's granaries,

which could represent considerable accumulation of wealth (often a tonne of millet in her study village), '...[pass] to the women's sons on her death rather than becoming the joint property of the whole household.' (1985:43)

The general decline in rainfall over the past fifteen years has led to the transfer of streambed (*kò*) and lowland (*fala*) from elder women to their sons. When the annual rainfall was higher, the streambed (*kò*) filled with water. Standing water was said to be found from June until February in certain locations. On this land, women grew rice. In the 1980s, rainfall has not been sufficient to grow rice. The lowland rice area is now the location of market gardening production by men (Ch. VIII).

Married women farmers' access to labour is more restricted than that of married men, especially household heads. As mentioned in the last section, some married men worked in their mother's fields after working in the household field and before going to their own plots. In addition, married women farmers recruited their unmarried sons and occasionally their unmarried daughters to work in their fields. Their access to labour is essentially restricted to their offspring, and these offspring, especially the men, have competing interests: their own farms and those of senior men.

Younger women of child-bearing age often work their own

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17. Lewis noted women's field land passing to daughters in matrilineal descent. This seems impossible because women often do not stay in the same village after marriage.

fields (*musoforow*). In the village near Wèlèsèbugu, the younger women of large households who also worked in the household field grew crops together in their own fields. In Household IV in Soro, the women who worked together in the household field planted a small (<0.25 ha) millet and *da* (Hibscus sabdariffa) plot. Large households with many young, married women are more likely to have such women's fields. Cooking, food preparation, and domestic work must fit into the daily schedule, and time for individual field work is likely to be found only where many hands share the work:

> ...it is common in polygamous families (the majority) where the burden of domestic work is lightened by the presence of numerous female offspring and with the aid of co-wives to see peasant women farming individual fields close to the village or devoting their efforts to rice growing. (Diakité, M. 1977:38)

The product of married women's fields headed by retired elder women or active household field workers, is a consequence of the political, social, and economic status of Bamana peasant women. The overall yield, while considerable, is only a fraction of that of the household field (see Chapter VII). Like other individual fields, the fields of women contribute to the household food supply should stocks run low. Women's role in production has been misinterpreted in the past due to the false image of women not participating in commodity production and producing only and all the subsistence crops (Creevey 1986:57-58). Women's fields and their products are oriented towards their own needs and

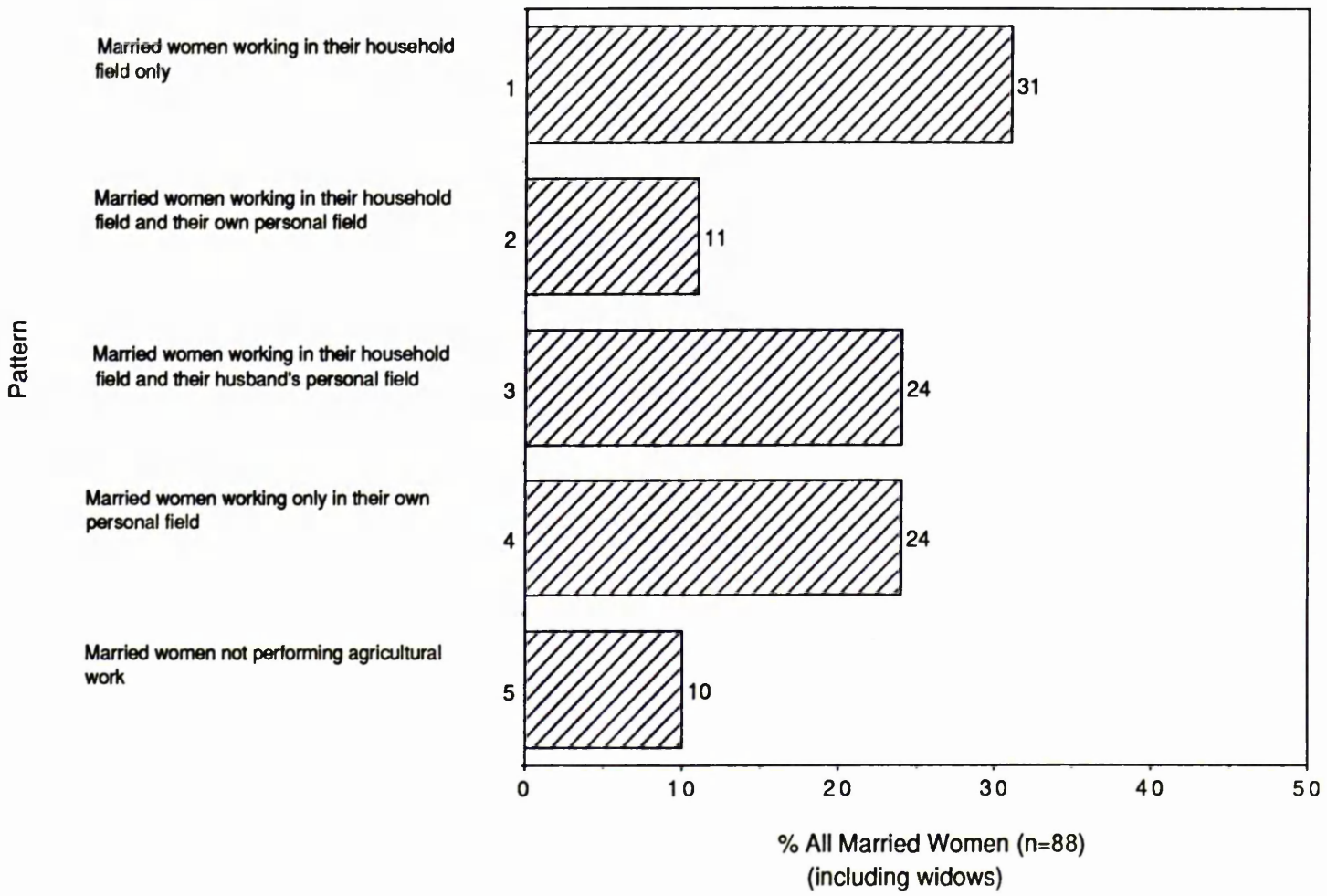
those of their children, whether in the form of commodity or subsistence production (cf. Toulmin 1985:43; Lewis 1979:299-313; Diakité, M. 1977).

Married women's patterns of field work and farm management contrasted with those of men. Unlike non-household head married men who in no cases only worked for their household, 31% of married women did (Fig. 5.4). This figure is distorted by the categorisation of household heads separately from non-household head married men. When <u>all married men</u> are considered, 37% of the married men worked only on their household fields which is similar to the proportion of married women.

Married women's field work and management Patterns 2, 3, and 4 from Figure 5.4 are related. The 24% of married women who worked only in their own field indicated by Pattern 4 had in the past worked either Pattern 2 or 3. All of them had retired from the household field labour force. As discussed above, some women can retire from the household labour group earlier in their lives than men. Whether a married woman worked in her own field or that of her husband depended on many factors: her personal status in the household, whether her husband had a personal field, her interest in having a field in a given year.

Women's contribution to the household labour group and her husband's personal field labour group took priority over her own field work. The priority may take the form of working for one's household's labour group and one's husband's personal farm while young (Pattern 3), and then replacing

Figure 5.4 Patterns of Field Work and Management by Married Women



Source: Fieldwork, 1987

the husband's farm with one's own field (Pattern 2) when one's own children can work for the husband. Alternatively, a married woman might be able to leave the household field labour group to work in only her own field (Pattern 4). In either case, a married woman farmer is likely to have more independence from work obligations in men's fields (household and personal) when her own children have reached the age where they can work.

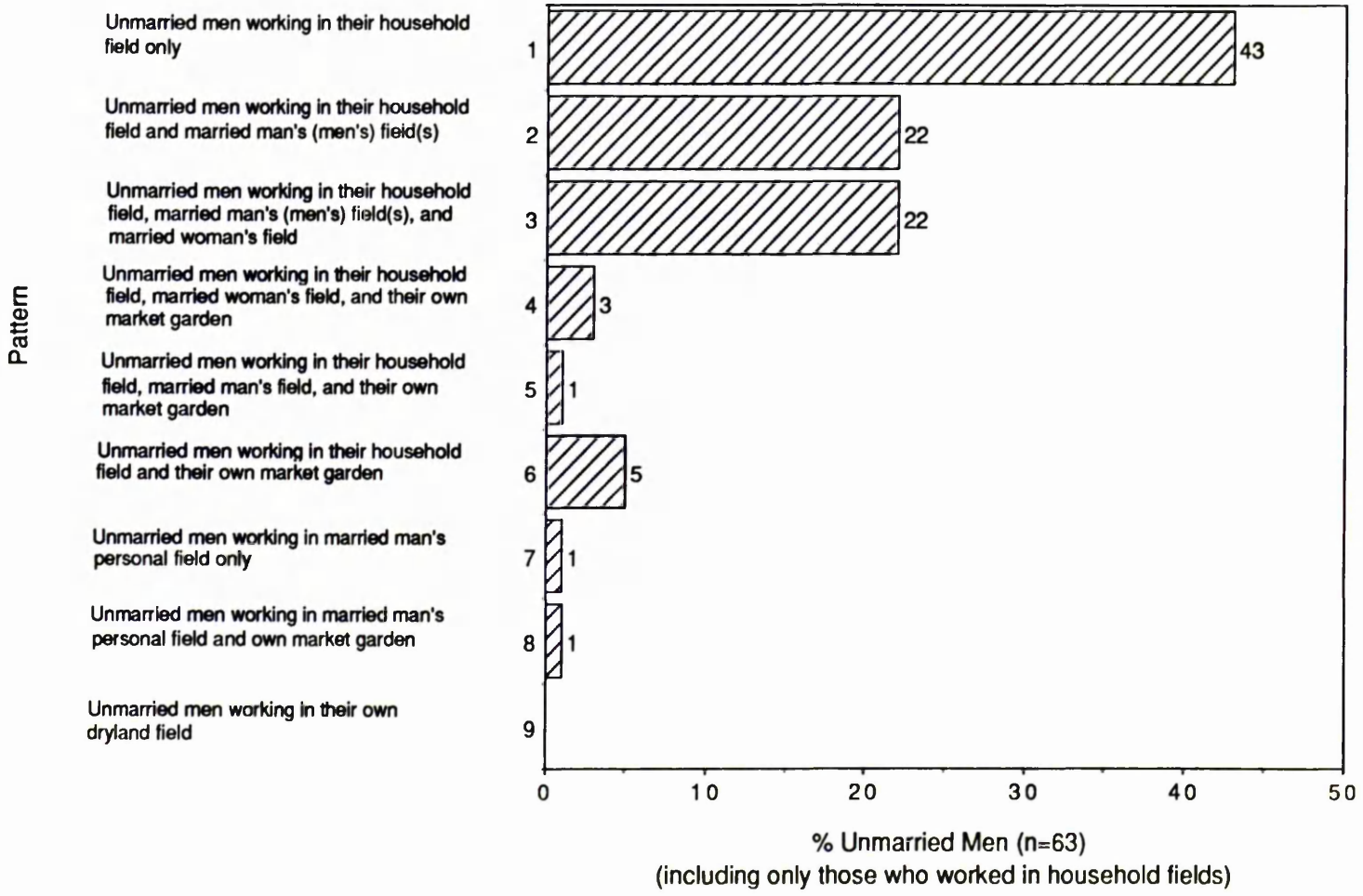
Like the married men, very few married women did no farm work at all. Of those married women not working on household fields, 10% did no farm work at all. These women included seven FulBe women from Household XX and the herder's family attached to Household I, as well as two women no longer working for health reasons.

d. Unmarried Men and the Village Youth Work Group (*tònci*).

Unmarried men have work obligations to each of the above categories: household heads, married men (older male relatives), and married women (their mothers). Figure 5.5 suggests that unmarried men have little access to land and labour. For most of these men, their labour is in demand by married men and women. They are not given time, or only very little, during which they could work their own field even if they had access to labour.

Figure 5.5 shows that unmarried men work primarily on the fields of others. Of those, nearly half (43%--Pattern 1) worked only on the field of their household. These workers tended to be younger and unable to work long hours

Figure 5.5 Patterns of Field Work and Management by Unmarried Men



Source: Fieldwork, 1987

on a variety of fields, or from small households where all efforts were devoted to the household field. Most (44%--Patterns 2-3) of the other unmarried men worked on not only their own household field, but on the fields of married men and married women. These married men and women were usually their fathers and mothers, but where fraternal relations were strong, younger brothers worked on their older brother's fields. Only six (10%) of the 63 unmarried men of working age[18] had a personal market garden (Patterns 4-6) and none had a dryland field. The two men (Patterns 7-8) who did not work with a household labour group were non-lineage workers.

In Soro, while some unmarried men had their own market gardens, none had a personal dryland grain field:

> Theoretically it is admitted that a circumcised boy may have his own *jònforo* just as may a girl once she is married; but in practice it is another thing. (Koné et al. 1983:19)

Grain is grown primarily for subsistence. An unmarried man, even if he had the time to grow it, would thus have little interest in growing grain since he assures his food supply through working in the household field labour group, as well as for his older male relatives and his mother. However, unmarried men are interested in obtaining money for the purchase of consumer goods, to assure enough money for a bride (even if a man's father pays for his first wedding, a man

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18. I have included all unmarried males who performed agricultural work. These include all men (boys) over 14 years, and some as young as 10.

may want to save for a second wife), and to accumulate enough cash to develop some independence from the head of household.

Such independence is not entirely a sign of conflict between young and old, subsistence and commodity production, nor does it necessarily signal the dissolution of the household. Unmarried men secure access to land from their household heads who have an interest in keeping the young men in the household labour group. If the household does not have any land suitable for market gardening, then men enter into land borrowing arrangements with other farmers in the village or in neighbouring villages (Ch. III). The intensive, small-scale market garden is an especially suitable form of production for unmarried men who have no dependents and only have access to their own labour and sometimes that of their younger brothers. This complementary side of the farming system will be explored further in Ch. VIII.

In Soro, 32 (51% of farming unmarried men) unmarried men have organised their own collective work group (*tòn*) which can be hired by farmers who can pay cash for the services rendered. The *tòn* has become particularly well-known ever since it was incorporated into the name of the ruling party's rural development programme: *tòn villageois*, discussed in the last chapters. To emphasise its role as a work group of unmarried men that has developed to combine their interests in earning cash for entertainment with the interests of heads of households and personal fields, I will briefly outline three kinds of *tòn* that have their origins

as a Mande social institution. Details on its social and religious roles can be found elsewhere (Leynaud 1966, Pâques 1954).

Village age group associations or non-household/non-kin labour groups are common in many parts of Africa beyond the Mande cultural zone (e.g. Swindell 1985, Saul 1983). In Bamana agriculture, the only major farming group alternative to the household and kin based *du* is the *tòn*. A *tòn* comprises age sets. Age sets are made up of men or women of the same relative age--within two to four years from different lineages and households.

For men, the traditional bond of the age set has been circumcision, an important rite of passage. In this way, it has a religious background linked with the *kòmò*--a Bamana initiation society (Brasseur 1961:641). However, the *tòn* institution itself is secular (Dembélé 1981:125). For women, age sets have been organised in a manner similar to that of men. Many forms of *tòn* have existed, coming together for different occasions to perform different tasks. A *tòn* may include several male age sets with members' ages between approximately 15 and 30 years.

In return for their work, the members of the *tòn* would be fed by the host family, or paid with grain or a goat that would be consumed during a dry season festival. When they work, the event has been likened to more than just labour and production. The work is a celebration with boys hoeing and girls dancing and singing (Kébé 1981:39). For these reasons, they have been called variously, village youth as-

sociations, young people's associations of the initiated, mutual aid groups, and communal work groups.

Some Bamana *tònw* have been oriented towards assisting those farms (*duw*) without sufficient household labour resources due, for example, to the circumstances of the domestic reproduction cycle. The *tònw* are changing under the influence of social and economic pressures. As Brasseur noted in his 1955-58 study with Youssouf Cissé in Ntèntu near Buguni, 'Today their existence is an economic question: large farmers who no longer have captives but do not have enough workers use them.' (Brasseur 1961:641) Swindell (1985) has argued that the growth of work groups in the twentieth century is a consequence of the decline of slavery. Slaves had been used to increase the household labour group. The village labour association has developed to fill the void created by the abolition of slavery.

A great variety of forms of the Mande age associations has existed.[19] Leynaud (1966) has catalogued over 200 *tònw*. In Soro, the members of the *tònci*[20] were at pains to distinguish between three general types of *tòn* that have existed in Soro during different historical periods.

First, the *bamanan tòn*, where mutual aid and assis-

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19. Cf. Turrittin 1987:92-3; Koenig 1987:120-121; Teme 1985:95-106--on *buranci, kotebaci, n'tomoci, benci, baci, doloci*; Toulmin 1985:47-8; Sanogo 1984:12; Bagayogo 1982:176-7--on *dama, foro sonyè, cikè ton*; Dembélé 1981:125-6; Kébé 1981:39; Lewis 1979:136-9, 198-200--on *ton prieri, tonba, deme baara, dama baara, jè*; Jones 1976:284-5; Ernst 1976; Leynaud 1966; Brasseur 1961:641-2--on *ton tji, solima, tilekoun, forosougna*.

20. Residents of Soro called their *tòn* both *tònci* and *cibò*.

tance, singing, and the *kòmò* all played roles, existed in the past in Soro but not anymore. Today, the *tònci*, the second general type of *tòn*, has about 30 members, unmarried or only recently married men aged 15-30. They come from the *duw* of central Soro. Plans were afoot to expand the membership to Fulabugu, and possibly later to Mamaribugu. The young men of Sakobugu were members of a *tòn* based in the neighbouring village of Nkòniko. This *tòn* is a labour group that sells its services, principally weeding, to farmers at fixed rates. The income is spent on food and musical entertainment for dry season parties.

The third kind of *tòn* is that of the Union Démocratique du Peuple Malien (UDPM), the sole legal political party in Mali. It is called the *tòn villageois* 'village *tòn*' and is the conceptual centre-piece of the state's rural development programme. As such, and through its implementation with agricultural extension agents, it is one of the ways that a branch of the state interacts directly with the peasantry. In 1987, Soro had no *tòn villageois*; the closest was in Munzun. The *tòn villageois* includes some of the elements of the other two *tònw*, such as a village-wide labour organisation but contains fundamental differences.

To summarise this sub-section on the access to land and labour of unmarried men, it should be evident that this category of farmers mostly produces crops on land held by other farmers. The unmarried men depend on these other farmers--mothers, fathers, uncles, brothers--and therefore provide them with their labour. Later in life, if they stay

in the village and marry, they can count on unmarried men working for them. The only labour to which they have access is their own, or occasionally that of a younger brother. Due to this limited access to labour, and the heavy demand on their time and energy by their seniors, the only field types under the authority of single men are market gardens, and only 10% of them had these.

Within the farming system oriented toward the production of dryland grain crops in the household field, unmarried male farmers are complements to the farming organisations of married men and women. The youth farm labour group (*tònci*) also complements this structure of the farming system. The collective labour of unmarried men supports the farming endeavours of married men and household heads.

e. Unmarried women.

Compared with the unmarried men, the role of unmarried women in the farming system is very different. The sisters, nieces, daughters, granddaughters, and grandnieces of the heads of households were infrequent field workers. Of the 22 households, they were observed in the household field (*forobaforo*) of only four, and even in these households they were only occasional sowers or weeders. Unmarried women were not observed at all working in the personal fields of married men (*jònforow* or *bolofèforow*) or market gardens, and were observed helping only one married woman (XIV,1) to sow for only a few days.

In Soro, unmarried women (girls) were said to be given

a period of less demanding work before the arduous responsibilities of married life. For this reason, they rarely worked in the household field. If the year happened to yield a large shea (Butryospermum parkii) crop, then they would be unlikely to work in their mother's field. In Soro in 1987, girls spent the mid-day periods of the wet season collecting shea fruit, and during the dry season they collected wood.[21]

When young women marry, often before the age of twenty, they leave their parents' compound to live in the compound of their husband. In the first few years of marriage, young women will often return to their parents' compound during the wet season to cook, prepare shea, and visit with their family. In Household II, two recently married daughters returned to Soro in June. Although they did not do any strict field work such as clearing, sowing, or weeding, they--like their unmarried sisters--helped prepare food, sweep the compound, and collect shea fruit. Neither of these young women had had children yet. Once a newlywed had children, they said, a married woman was more likely to stay with her husband's household during the wet season and to join the household labour group of which he was a part.

Unmarried women's access to land and labour was restricted. Theoretically, they could grow market garden crops. Most help their mothers to produce goods for sale,

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21. Cf. Lewis (1979) said girls worked on their mothers' fields, but also noted that there was essentially no shea fruit in the post-drought period during which he conducted his field research.

especially shea butter and fuelwood, while their mothers work in the fields of the household and their husbands. Their role in the farming system is thus complementary to their mothers' cash-earning activities, and, because they help their mothers to prepare food, wash clothes, and keep house, they also back-up their mothers' domestic responsibilities allowing their mothers to work with the household field labour group.

f. Non-lineage household members.

Although the farming role of non-lineage household members is discussed in Ch. VII, some of them did grow their own crops in Soro. Their presence in the village signals that they are supplying their labour to permanent, land-holding residents. Table 5.3 shows the high proportion (nearly half) of non-lineage household members who regularly worked for cash during 1987 as employees of other village residents. Only three of these workers grew any crops of their own at all.

The workers and students regularly worked on household and personal fields (mostly those of married men). Non-lineage residents tended not to have access to land, and even if they did in theory, they did not have time to work it. They were selling their labour, farming and herding, or living off the sale of fuelwood from the bush.

Table 5.3

Non-lineage Household Members, Soro, 1987

	Sell Labour[1]	Have Plot of Land	Household	Total Persons[2]
Herders	1	1	I	7
	1	0	II	2
	1	1	IX	1
Workers	1	0	II	1
	1	0	XIV	1
	0	1	XIV[3]	1
	0	0	XIX	1
Students	7	0	XIII,XIV, XV	7
Charcoal Makers	0	0	I	4
Total	12	3	-	25

[1] Includes persons who regularly work for cash renumeration. The principal employment of time by these persons is not, however, necessarily to sell their labour.
[2] Figures include entire family, e.g. one herder lived with his mother, wife, two small children, brother, and sister-in-law, none of whom herded. These are residents only, though they are in some cases only seasonally resident.
[3] Worked only on *jònforo* of younger brother of *dutigi*.

iv. Regional similarities in the organisation of production.

Useful parallels may be drawn between the Bamana production units and field types and similar structures in other West African cultures. Within the greater Mande cultural zone, the Dyula of northern Côte d'Ivoire have a *foroba foro* and a *jongarri*, corresponding to the *forobaforo* and *jònforo* of the Bamana (Bassett 1985). The Soninké of western Mali, Senegal, and Mauritania farm a *tè kore* 'big field' and a *soma-n-te* 'field of the first born son' (Pollet and Winter 1971). The Senufo of southern Mali and northern

Côte d'Ivoire work a collective family field *sekpo*[22] and individual fields *tologo* allocated by the head of the farming unit (Coulibaly 1978). In Burkina Faso, the Gourmantché have a *diedano kwanu* 'collective family field' and a *suali kwanu* 'personal field' (Remy 1967:58), and the *dowèro lo* 'night field' of the Lobi is reminiscent of the *suraforo* of the Segu Bamana: a field worked by adult sons, married or not, and their wives and children after working on the extended family field (Rouville 1987:57).

These examples do not exhaust the possibilities for comparison.[23] In each of the cases cited, the changing nature of the social and production organisation was noted. Pollet and Winter, for example, noted the tendency toward the individualising of work and the breaking-up of the family as a natural course (1971:380), and Remy said that today there was more division of land between sons, with the personal fields becoming more important and the collective family field rare (1967:58). The well-documented *gandu* (plural *gandaye*) of the Hausa in northern Nigeria and southern Niger have undergone such changes, the causes of which are complex and resulting form varied (Watts 1983; Raynaut 1971; Hill 1972; Nicolas 1962; Smith 1955).

Although I presented the outline of the *gandu* changes

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22. Spelled *segnon* in Bassett (1985).

23. Cf. Jonckers and Colleyn (1974:49) on Minyanka *foroba* and *jònkani* units. Hill (1982:96-97) refers to similarities, while noting significant differences, in the social structure of Indian households, as part of her foundation for proposing a dry grain mode of production.

in Ch. I to introduce some of the concepts of households and household labour pertinent to this thesis, it is worth highlighting the similarities between the Bamana and Hausa farming organisations. Similar to the descriptions of the model *du*, the classic *gida* 'house or compound' of the early nineteenth century was the unit of production which incorporated sons, clients, and slaves into a *gandu* 'farming organisation' (Smith 1954:27). The head of the farming unit or *mai gida*, like the *dutigi*, had to pay tax and his sons' marriage expenses, provide food and shelter, and allocate individual fields (*gamana*) to married brothers and sons (Watts 1983: 529). The *gandu*, like the *forobaforo*, has been the subject of a general claim of dissolution. But, also like the Bamana *forobaforo*, the *gandu* is '...far from moribund.' (Watts 1983:403)

v. Change in the organisation of production.

The origin and nature of West African farming organisation has perplexed researchers and development planners over the last thirty years. Some may have seen the individual fields as 'modernising' vehicles, where cash crops would flourish and with them new farming techniques and a reorientation of peasant farming goals in general (Jones 1976). While others have signalled their eminent demise as a result of contact with commodity production (Ernst 1976; Jones 1976; Billaz and Diawara 1981; Gallais 1967; Pâques 1954).

The impact of changes in the orientation of the broader

political economy on peasant farming reverberate in the analysis of the changes in the production units and as a result their field organisation. Up to the end of the 1950s the household common property (*foroba*) mechanism was still intact: 9.8% [1960] of *forobaforo* was reserved for export crops (Ernst 1976:76-77). The *foroba* absorbed the beginnings of commodity-money relations. This change is echoed in Bassett's study where commodity relations were internalised in the *foroba foro* and *segnon* in the precolonial era and the first thirty years of colonial rule, until economic policy shifts led to the break-up of all *segnon* in the 1940s (1985:158-9).

Increasing production demands on the large corporate group have led to its breaking-up. If the farm head cannot assure the subsistence needs, meet the state's tax, and provide sufficient personal goods in an increasingly consumer product oriented society, pressure increases especially along the lines of internal oppositions to split up into individual production units:

> It is the direct result of the penetration of commodity-money relations in the community which awakens in the producer the desire to sell his surplus product on the market. This desire must place him in contradiction to the production and distribution system of the extended family--with its *foroba* mechanism--and must end in opposition to the extended family and its foundations. (Ernst 1976:121)

The personal field grows '...because the producer can use its products at will, without coming into direct conflict with the norms of the extended family.' (Ibid.) The pro-

ducer, in this context, is one who would have worked a household field under the authority of a *dutigi*. The *dutigi* can allocate land to his wives, brothers, and sons as a step to meet their desires for personal needs. The brother or son can, in finding the allocation insufficient, opt to migrate to sell his labour. The change in the economy has been coupled with increasing individualism that fuels the conflict with traditional authority (cf. Watts 1983:116).

In the case of Soro, the heads of Households IV, VII, and IX may have been particularly successful in maintaining the corporateness of their respective households <u>because</u> their fieldworkers have been successful in earning high returns from their personal fields. Without access to fertile land on the one hand, or a lucrative market for the products of the fields on the other hand, the household members might not have had adequate inducements to remain together as large fraternal (IV and VII) or paternal *duw*. In contrast, the organisation of Household XIV fits the model of decentralised authority[24] where the unity of production is expressed in a reduced household field, and the bulk of production takes place in a federation of individual fields with access to some common and shared labour and tools.

The contrasts in field allocation and tenureship of land expressed in Figure 5.2 are the spatial reflection of

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24. In Kaita northern Nigeria, Watts found that a decentralisation of autocratic familial authority had resulted in 80% of the *gandu* being organised as loose, cooperative *gandu* (1983:403).

divisions and tension within the Bamana farming system. Personal fields exist in conjunction with household fields. The existence of one does not preclude the development of the other. The fields are worked by divisions and subdivisions of society. The field types are related to the social structure just as the members of households who control them are. The tension arises when the production interests of the labour groups, and the individuals within those groups, come into conflict. The allocation of more land to further subdivisions of the household as a measure to alleviate the tension and give more autonomy to more producers ultimately seems to contradict the goals of a unified household. Does it necessarily?

The intra-household struggles for control of production by gaining access to labour and land <u>can</u> lead to the dissolution of the household farm. <u>Could</u> the autonomous production units within the household not also contribute, in some cases, to the strengthening of household farms? Where farmers control land that can produce commodities for which an accessible market exists, household labour may reorganise, as a result of demands for greater cash income by junior household members, to accomodate their interests. Paradoxically, household heads who have historically controlled land and labour may be forced to further distribute their power in order to retain it. These questions will be examined further in the next three chapters when I focus on labour and land use in three village ecological and production zones.

Conclusion.

In this chapter, I have focused on the roles of land tenure and the organisation of production as they relate to farming. Power centres in the social structure control the means of production which in capital-poor Malian agriculture consist principally of land and labour. Bamana peasants have an economic role as producers. But, their organisation of production is a reflection of their social structure, and this is nowhere more evident than in the access to land and labour.

The chapter is divided into two sections based on the level of access to land and labour. At the village level, social and political unity centres on the chief (*dugutigi*). The powers of the individual occupying the position of *dugutigi* are sanctioned in historical social practice. These powers are, however, ultimately subordinate to the laws of the Malian state. The village level responsibilities of the chief comprise the communal holding of the village people. These include various powers related to the general welfare of the community. Among these responsibilities is the management of one of the vital productive resources: land.

The chief allocates land to newcomers, hears land disputes in consultation with his council, and oversees the use of the public land. With this authority over land, chiefs can expropriate land. This position of power with regard to the means of production is kept in check by social sanctions, the sharing of decisions with heads of households

(*dutigiw*), and especially the limited access to means of production which would otherwise increase social differentiation. Not surprisingly, land appropriation has occurred where social differentiation is most marked, especially where a land market has developed. There is no land market in Soro, but the labour market of Bamako and coastal country enterprises affects Soro's labour resources.

The second section of the chapter is at the level of the household (*du*), or sometimes called compound or farm. Within the household, units of residence, accumulation, consumption, and production overlap. Production units are especially important to the organisation of the farming system, and their agricultural fields are the clearest spatial expression of production. They are a spatial diagram of social structure. First, the household field (*forobaforo*), each controlled by a *dutigi* occupies the greatest area of cultivated land under a single form of tenureship. The product of these fields is oriented toward the reproduction of the patrilineal gerontocracy which controls them. Second, individual fields are the places of production of household sub-groups. Their product is the property of other, smaller than household social entities. Married women, plus the younger brothers and sons of the *dutigi*, produce crops for which they are responsible, hence the frequent equation of individual fields with personal fields.

This pattern of tenureship and social structure has parallels throughout the West African savanna. Changes in the pattern have been related to changes in the regional

political economy. The changes, usually described as a proliferation of individual fields at the expense or even disappearance of the household field, have not led to the eradication of household fields. The increased involvement of peasant producers in commodity production certainly is driving the change, but these producers are on the periphery of the centre of market change affecting their commodity production. These Bamana peasants, at least in Soro, continue to orient their production toward reproducing the social structure centred on the chief. Breaks in the household result from numerous causes and require adjustments to the mobilisaiton of land and labour resources. One such adjustment is the redistribution of field units. The changes in characteristics of types of fields are thus part of the constant adaptation to the changing context in which farming occurs.

The users of different areas of land thus modify land in a way that reflects their own interests. In this way, areas of land used in production are a spatial manifestation of clan and household relations (Raynaut 1971). In some cases, allocation of fields results from intra-household conflict, but the skilful mediation of opposing interests of household members can produce a complementary system of fields. Just as the fraternal rivalries (*fadenyaw*)[25] are best channelled into productive competition in the household

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25. Rivalries between brothers of the same father but different mothers (*fadenya*) are well-known in Malian history and culture (Ba 1987; Johnson 1986). Recently, the Mali-Burkina border skirmish was described as *fadenya*.

field, delegating the time for work on personal land or income-generating activities may succeed in maintaining a large household labour organisation.

Bamana land and labour organisation may be more fluid than has often been assumed, uniting and disintegrating, emerging and retracting in response to influences of the domestic cycle, market access, and other variables. The changing balance of constraints and power relations influences the spatial dimension of peasant agricultural production (Pred 1984). The field types change, as has the youth labour group (*tònci*). At the heart of this land use relationship is the interdependence between social and spatial organisation. The next three chapters will provide detail on this interdependence starting at the levels of three broad village production zones: bush, field, and garden.

Chapter VI.

Savanna Ecology and Extracting Bush Resources.

In this chapter, I will show how land resources contributing to the growing of crops are not limited to the cultivated area around the village. The *foro* 'field' - *kungo* 'forest/bush/uncultivated land' relationship is not one of field insertion into 'natural' milieu, but one best explained through an understanding of the complex web of ecological relationships in the savanna ecosystem. A single parcel of land can have multiple uses at a particular moment in time, and over a decade can be both field and bush, pasture and woodland. In this way, the complexity of land use in Soro, as in many peasant societies (Richards 1986, 1985), requires an understanding of local ecological processes .

The bush as a zone in the village territory is not only a reservoir of fallow land for field agriculture. It also supports production of subsistence and commercial goods in its own right. The products of uncultivated land[1] have a social and economic relationship with the products of cultivated land. For this reason, in addition to the ecological relationships with crops, production processes in the uncultivated sector of land must accompany the study of a farming system.

To illustrate the relationship between the cultivated land use sector made up of fields and gardens on the one

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1. I will use the term 'extractive resources' (Hecht et al. 1988) to denote the products of uncultivated land.

hand, and on the other hand the non-cultivated bush, I will refer to the schema of gardens (*nakòw*), fields (*forow*), and forest/bush (*kungo*) (Table 6.1). Land use can be seen as a continuum with the intensively cultivated, irrigated year-round gardens at one end, the dryland fields occupying middle ground with labour time input concentrated in a few months on bush-fallow fields, and the bush or natural land at the other end of the continuum where minimal human intervention is used in production spread throughout the year.

Table 6.1

Land Use Continuum, Soro, 1987

	nakò garden	*foro* field	*kungo* forest, bush
Type of Production	intensive cultivation	extensive cultivation	collection/ extraction
Season	year-round	sowing and growing wet season (Jun-Sep) to harvest (Sep-Dec)	year-round
Products	domesticated fruits & vegetables	domesticated rain-fed grains and pulses	wild fruits & herbs, fuel-wood, livestock, game, medicine, bldg. mtrs., honey
Land Type	arable, high water table	arable, clayey to loamy soils	diverse land types, spatially removed from village

This complementarity of functions is the focus of this chapter, as well as the role of the bush/forest as a zone of production and the reservoir of the underlying ecological

components of agriculture. The next two chapters will introduce respectively the dryland farming of the fields and the market orientation of the gardens.

In each section of this chapter, I will briefly describe both the Bamana interpretation and peasant use of natural phenomena. The first of these is climate which is not at all exclusive to the bush. I include it here with other natural phenomena which form the foundation from which farmers operate their agrarian system. Climate also fits into this chapter because it is so closely linked to the definition of seasons which are partly known through signs read in the bush. In the second section, I introduce Bamana land types, vegetation, and soils.

In the third section, I present four uses of bush resources in the social and economic life of the village, and in the fourth section, a more detailed description of the two most important productive activities based on bush resources, the procurement of fuelwood and shea butter. In the final section, I show how the organisation of this production is especially pertinent to the Bamana gender division of labour.

1. Climate.

Climate is a factor over which farmers have no control, yet they can, by their understanding of it, adapt their farming system to it. It is an important factor determining the success of farming, and the extent of this success depends largely on technology. Human manipulation of re-

sources such as cropland water, for which dryland farmers depend on the precipitation of clouds, is a technological question. Irrigation works could decrease dependency on rainfall. Because Soro farmers do not have access to the kind of technology that could decrease their dependency on favourable rainfall, they rely on their knowledge of the local environment. This section thus focuses on the steps taken by Soro farmers to minimise the risk inherent in their dependence on this scarce resource.

i. Seasonality.

The major factors in West African seasonality include the continental high pressure system formed over the Sahara to the north, the source of dry, hot northeasterly harmattan winds from December through April. This is the North African anticyclone. The St. Helena anticyclone is the counteracting system. Formed over the Atlantic, it is the source of moist, maritime winds from the southwest. The moist air arrives in Mali as a function of the location of the Inter-tropical Discontinuity (ITD). Generally the ITD is north of Bamako by early May and the rainy season is expected to start several weeks later, around the beginning of June for this longitude and latitude.[2] The ITD, however, is not a fixed climatic condition. Sometimes it remains in the south, bringing drought to the Sahelian region, and some-

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2. The main factors influencing rainfall at Bamako are the depth of maritime airflow (55.4%) and precipital water vapour (24.4%) (Anyadike 1979, in Hayward and Oguntoyinbo 1987:86).

times it lingers in the north causing high rainfall in the Sudanian and Sahelian zones.

Soro is within the 1000 mm and 1100 mm annual rainfall isohyets (Barth 1986:53; Kamaté 1980:15), at least for the period 1950-1969. Baginda, the closest meteorological station, has annual precipitation records dating to 1952. Annual rainfall has fluctuated greatly since then, with highs in the wet 1950s, such as the 1241.7 mm of 1957, and lows during the seventies and eighties, such as the 613.9 mm of 1973. This annual total fluctuation corresponds to the pattern for the West African region as a whole, bearing in mind that, considering the fluctuations, data are not available to cover the region for a reasonably long period (Hayward and Oguntoyinbo 1987:90-95). Baginda's annual precipitation for the last five years has not even reached 900 mm (Figure 6.1). The 35 years of rainfall records appear to be insufficient to show the importance of annual fluctuation.[3]

The Bamana seasons recognised at Soro correspond to changes in the weather as well as vegetation and cultural activities:

samiya	wet season (June-September)
kawule	humid, post-*samiya* (mid-Sept - Oct)
fobonda	ripening of many wild fruits (October-Nov)
fonènè	cold season (December-February)
tilema or *taaratile*	dry, hot season (March - mid-May)
samiyadonda or *sankunanji*	humid, pre-*samiya* (May)

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3. The devastating droughts of 1913 and 1972-73 (Hayward and Oguntoyinbo 1987:93; Watts 1983:287, 379) point to the need for long-term data in order to evaluate 'normal' precipitation. See Appendix for 1987 daily precitation record at Baginda.

Fig. 6.1 Mean Annual Rainfall, Baginda, 1983-87 (mm)

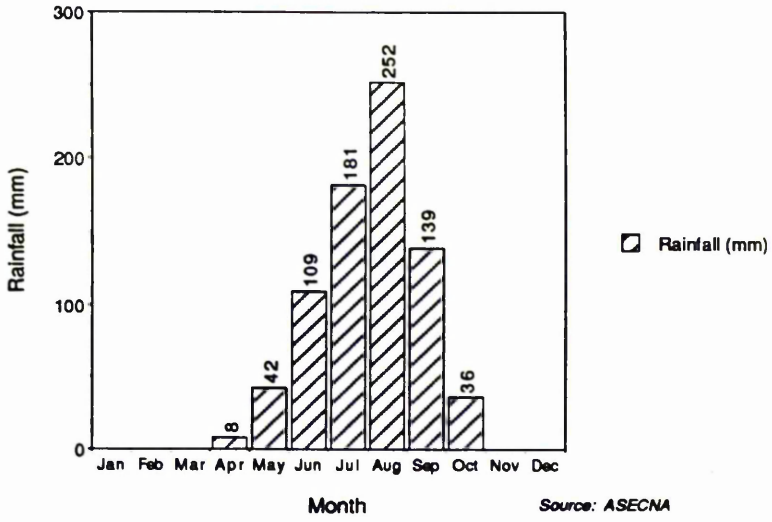
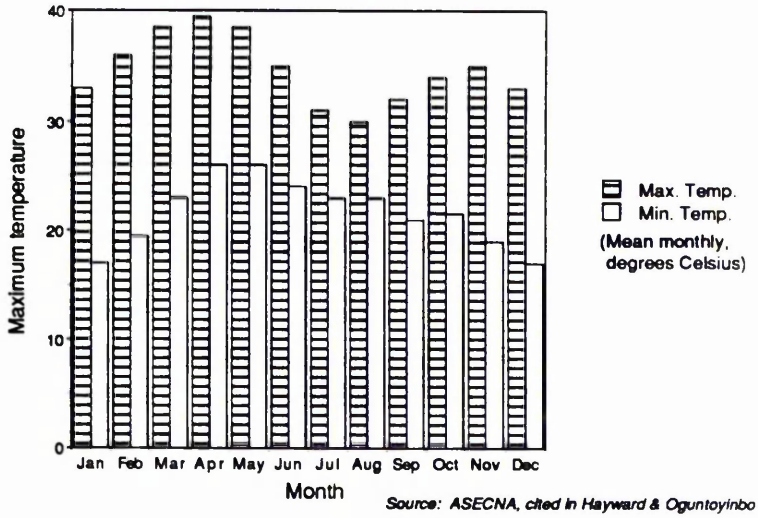
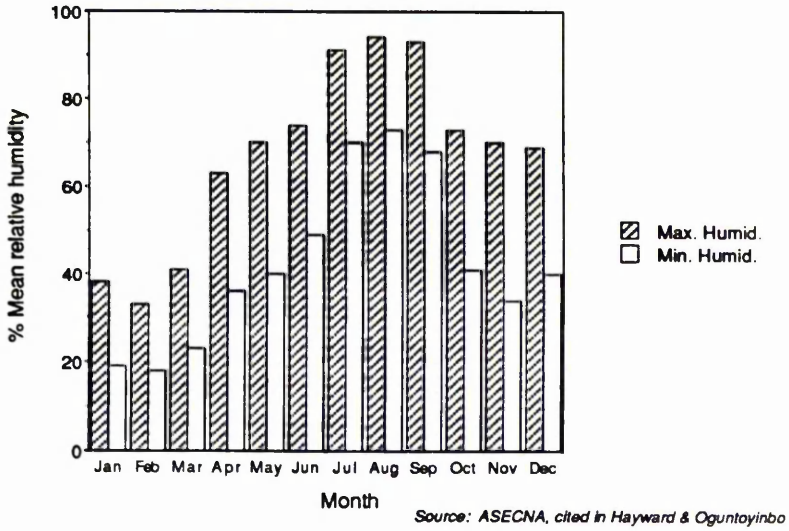


Fig. 6.2 Bamako Temperatures & Humidity

A. Maximum & Minimum Temperature



B. Maximum & Minimum Relative Humidity



These seasons[4] can be compared with the four-zone model for West Africa (Table 6.2). During *samiya*, Soro is under the influence of first Zone C during June and July, and then in late July or August Zone D conditions prevail. The *kawule* season is marked by a relatively rapid passing of the ITD and Zone C. Zone A dominates the year during *fobonda*, *fonènè*, and *tilema*. During April when the daily 41-45°C highs of *tilema* prevail, Zone B conditions begin. By May, Zone B is dominant and Zone C begins to appear.

Two kinds of rain storm are common in this part of West Africa: thunderstorms of great intensity but short duration resulting from local convection, as in Zone C, and rains of longer duration and lower intensity that affect a large area, such as are described in Zone D. The thunderstorms are particularly common at the beginning and end of the wet season (*samiya*), when the ITD is moving past.

The unpredictable and hesitant start of *samiya* is due not just to farmer anxiety over when to plant, but to the ITD's slower northward movement, at 2°30′ per month, as compared with its return southward, at 3°30′, at the end of the season. This difference in rate makes the Zone C storm sea-

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4. Hill (1985:5) mentioned four Bamana seasons--*samiya, kaula, fonéne, tilema*--and compares them with FulBe and Tamasheq seasons: 'Note that the agro-pastoral and pastoral groups, the Fulani and the Tamasheq, use a more detailed division of the year than the agricultural Bambara.' Bamana seasons are more sophisticated than are represented in this comparison. Also, this statement implies that there is an intrinsic difference between pastoralists and agriculturalists that would determine their outlook on seasons. This would seem to be environmental determinism in reverse: a type of social organisation determining the climatic seasons.

son shorter at the end of the rainy season than at the beginning (Hayward and Oguntoyinbo, 1987:119), and accounts for the short duration of *kawule*.

Table 6.2.

Four-Zone Climate Model

(adapted from Hayward and Oguntoyinbo 1987:116; and Kamaté 1980:14)

Zone A: North of the ITD; little cloud, but dusty haze common; vapour pressure below 15 mb; large diurnal temperature range; ENE winds; common nocturnal temperature inversion near the ground, but strengthening towards midday with increasing convection; no precipitation.

Zone B: South of the ITD up to 320 km; humid (50-60% midday, up to 100% at night), but little rain; temperatures 20-24°C at night and daytime highs 35-43° inland; isolated late afternoon thunderstorms; restricted cloud development; overnight and morning winds are from SW, sometimes freshening during the day and becoming SE.

Zone C: Approximately 800 km wide belt south of Zone B; temperatures and humidity similar to Zone B, but daytime convectional activity is marked and local thunderstorms and westward moving line squalls are prominent; rainfall in heavy showers.

Zone D: Approximately 300 km wide belt south of Zone C; rain almost daily in showers five to six hours long, but sometimes all day; stronger winds than Zones B and C and from SW; thunderstorms infrequent; skies frequently cloudy and overcast; inland temperatures to 26°C, nights 20 to 23°; humidity high as in Zone C.

The areal difference between Zone C and Zone D types of rain is significant when the precipitation recorded at Soro and the Baginda station are compared. The early thunderstorms that covered both Baginda and Soro were unusual. Of the 11 days in May with recorded precipitation in either Soro or Baginda, on only two days (18%) did each record precipitation, and on each day one settlement had significant rainfall while the other had only a trace. In June, only 36% of the storms covered both places. Most of these storms

were the Zone C type, local thunderstorms of great intensity.

In contrast, 75% of the storms in July and 67% in August extended over both Baginda and Soro. Most of these were the Zone D type, of longer duration and less intensity.[5] In August 1987, rain was sometimes showery or very light (*coo coo*) and fog (*bugun*) rising from the moist soil on wet season mornings was not uncommon.

Unlike weather conditions in *samiya*, *kawule* and *fobonda* are known for moderate temperatures and, at least during *kawule*, lingering humidity; it is a comfortable time when wild fruits and field crops ripen. Bamako mean monthly maximum and minimum relative humidity percentages are 73, 41 and 70, 34 respectively for October and November; this moderation compares with a high in August of 94 and 73, and a low in February of 33 and 18 (Figure 6.2).

The dry air of the cold season (*fonènè*) initiates the coldest minimum temperatures, which with dust and wind leads to an annual increase in respiratory illnesses. Bamako's mean monthly maximum and minimum temperatures for December and January are 33 and 17°C. As the daily maximum temperatures gradually rise in February and March from their lows in January, the cold season dramatically becomes the hot, dry season (*tilema*). At this time, during April, dust devils (*funufunuw*) are common. In Bamako, March, April, and

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5. Evidence from Bamako suggests that not all Augusts there are characterised by Zone D type storms. This just confirms that irregularity is the rule (see Hayward and Oguntoyinbo 1987:96). Some Augusts have no rain.

May have the highest mean monthly temperatures, with April's the highest at a mean maximum of 39.5 and a mean minimum of 26°C. The highest temperature I recorded in Soro in 1987 was 44°C at 15.00 hours, 7 April 1987 in the shade of intertwined baobab and tamarind trees, followed by 43° days on 8, 15, 16, 17, 19 April.

ii. Weather signals and agriculture.

The location of the ITD is a regular feature of meteorological reports in Mali, because the agricultural calendar (Table 6.3), which is dictated by the coming of the rains, is so important to the national economy. In addition to and sometimes instead of radio reports of weather conditions, Soro's farmers, and West African farmers in general, read other signs of the coming rains. The arrival and departure of bird species are preliminary signs of the coming of the wet season. Of special importance is the *banikònò* (Ciconia abdimii), or stork, which returns to villages each year before the start of the wet season to nest in large trees. The first 1987 sighting of the stork in the village near Wèlèsèbugu was in March, at the time of the early rains (*sanji kuna*) which was long before the onset of the rainy season. Still, it was a reminder that the wet season was approaching.

In Soro, the presence of both the *ntoolen* (Tockus erythrorhynchus and T. nasutus) 'hornbill' and stork (*banikònò*) were noted. As the humidity rose in May with the change to Zone B conditions, the first distant thunder was

heard and the sighting of storks became more frequent. Children sang of the significance of the seasonal change: *'banikònò kili da, kili da, samiya sera'* 'The stork is laying eggs, laying eggs. The rainy season has arrived.'[6] Elsewhere in West Africa, farmers evaluate plant, animal, and weather changes to determine when to start planting in order to avoid seedling dessication at the start of the farming season (Richards 1985:47). Plant signals of seasonal change are also recognised by Bamana farmers, but were not as significant as bird and humidity indicators in Soro.

Table 6.3.

Agricultural Calendar.

Jan	Harvest chili pepper, green beans.
Feb	Harvest of wet season crops complete.
Mar	Plant tomatoes, dry season gardens.
Apr	Harvest mangoes. Water tomatoes.
May	Harvest and divide cassava. Harvest dry season gardens: tomatoes, melons, cucumbers. Clear fields for planting.
Jun	Sow grain crops.
Jul	Weed grain fields. Plant tomatoes, groundnuts.
Aug	Second weeding of grain fields. Plant watermelon, sweet potato, chili pepper.
Sep	Harvest early maize.
Oct	Harvest groundnuts.
Nov	Harvest main grain crops.
Dec	Complete grain harvest. Winnowing.

Farmers watch not only signs of gross changes in the

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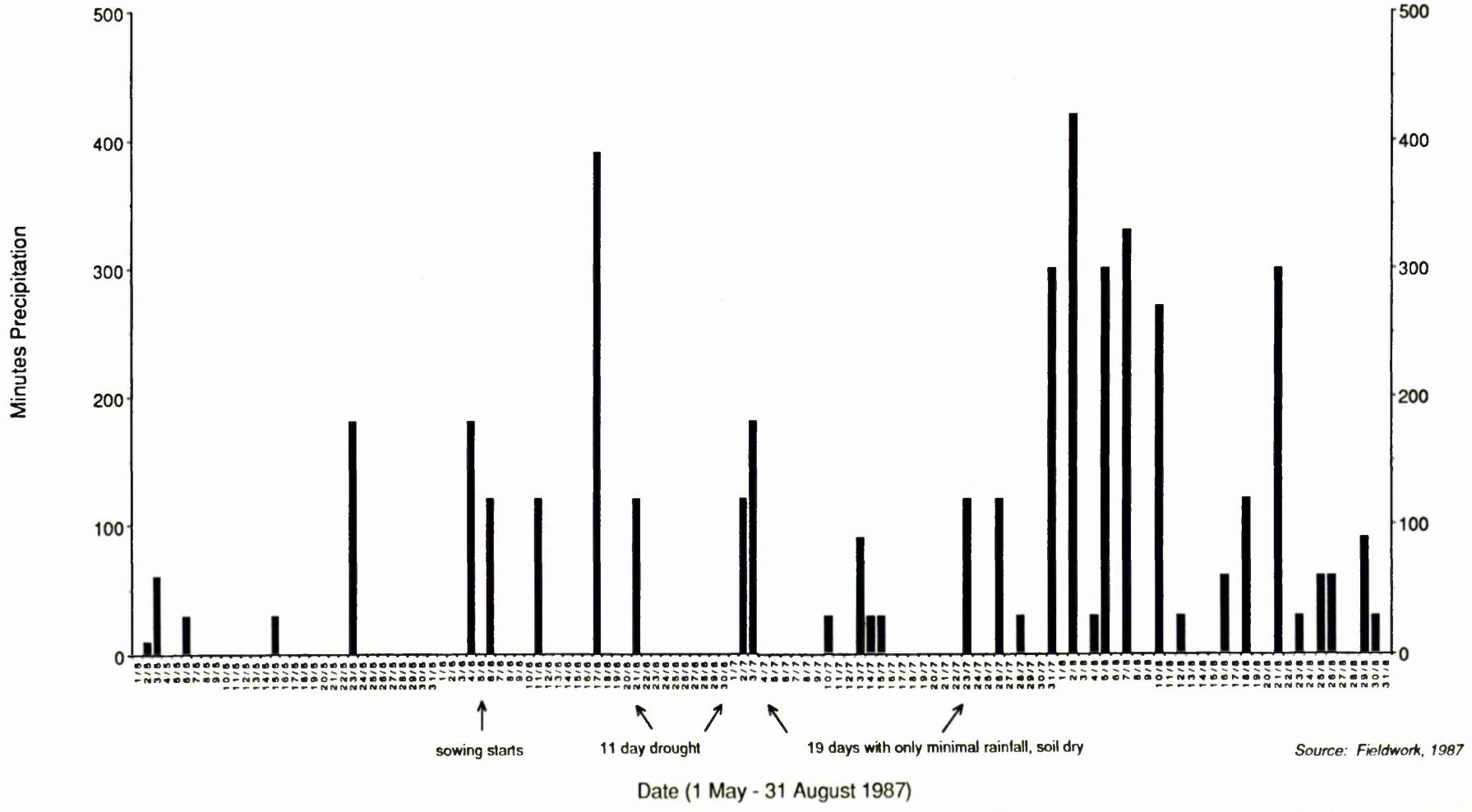
6. Mara (1980) noted the symbolic link between daily activity and the Bamana cosmos in Bamana conceptions of nature. In the case of *banikònò*, a stork brings good fortune in the form of the rainy season to the Bamana farmers but leaves humbly before it can appreciate it, departing before harvest.

seasons, but the frequency and intensity of rains, the direction of winds, and the relative temperature as signals primarily for when to plant. Of the two kinds of thunderstorm in this part of West Africa, those of Zone C more commononly occuring in May and June are especially significant to farming because this is when farmers must decide when the most propitious time to plant is. In Soro, one farmer explained how he 'read' the sky during times of local cloud build-up and imminent storms: if clouds can be seen in the east the chances of rain falling in Soro are good; if they are in the north or south then the chances that rain will fall in Soro are less.

The local significance was noticeable even within the village when, for example, on 10 July Mamaribugu fields received precipitation sufficient to penetrate the soil to the roots of millet, while at Sakobugu only the surface was dampened and the centre of Soro received only drops and heavy wind. Because the earlier storms tend to be the Zone C type, one village can receive considerable rainfall from a succession of thunderstorms while a neighbouring village only a few kilometres away might receive only a few drops from the same storms. This local incongruity causes some of the concern among farmers as they watch for signals of the definitive start of the rainy season.

The unpredictability of Zone C type storms which can wreak havoc on the successful germination of dryland crops can be seen in Figure 6.3. The first dryland grain planting in Soro began on 6 June. The rains 4 and 6 June had suffi-

Fig. 6.3 Wet & Dry Periods, May-August, 1987



ciently moistened the soil to begin maize sowing. The storm of 4 June had flooded roads and paths, but after a day the surface water had been absorbed. The storm of 11 June, however, was sufficient in the minds of many more farmers. It began at 20.00 at night with steady rain lasting over three hours and showers through the night. On the morning of 12 June, the soil was saturated, attracting most farmers back to the fields.

From the farmer's point of view, the storms that followed were spaced too far apart until the end of July. After 11 June, the next good storm was not for five days (17 June), then four days (21 June), then a soil-drying drought of eleven days (2 July) from which the soil moisture did not recover until the storm of 3 July. After 3 July, the next good rain was not for ten days (13 July), despite a half hour shower that dampened the soil surface on 10 July.

On 9 July, maize was beginning to wilt in some fields. The storm of 13 July was one and a half hours of heavy rain, but that of 14 and 15 July were only light showers. The next heavy rain was not until a two hour storm on 23 July. That ten day drought between 23.00 hours, 13 July and 17.00, 23 July forced two farmers to abandon their maize fields. The millet, sorghum, cowpea, and fonio withstood the dry period, but millet and sorghum densities were so low that most farmers had to fill in bare areas. Of these non-maize crops, the sorghum showed the least resistance to the drought and the fonio the most. Regular rain then continued every two to three days until 11 September, by which time

the crops were firmly established.

Certain crops are adapted to the climate of southern Mali. At the same time, farmers must have the skills to know how to time the planting of these crops according to the weather to take advantage of the rains. In a similar manner, the land types, vegetation, and soils are natural resources utilised by Bamana farmers.

2. Land Types, Vegetation, and Soils.

i. Geomorphology and hydrology.

Soro is 16 km south of the closest bank of the Niger River, the most outstanding feature of the physical landscape (Map 6.1).[7] It is on an upper Pre-Cambrian sandstone base. Locally, central Soro is at the head of a seasonal stream basin which leads south to the Faya, tributary of the Niger with a confluence nearly opposite Kulukòrò. Sakobugu is at the head of a separate basin (Nzaban stream) leading east to the Faya.

The highest point in the area lies four kilometres southwest of Soro, Kulujanjan, 454 m. Soro itself is about 100 m lower, just below the 360 m contour. Kulujanjan is a part of a series of hills (*kuluw*) to the west and south of Soro topped with lateric crust and gravel. To the east, between central Soro and Munzun running northwesterly is a low rise that separates the Sakobugu and Nkòniko basin from that

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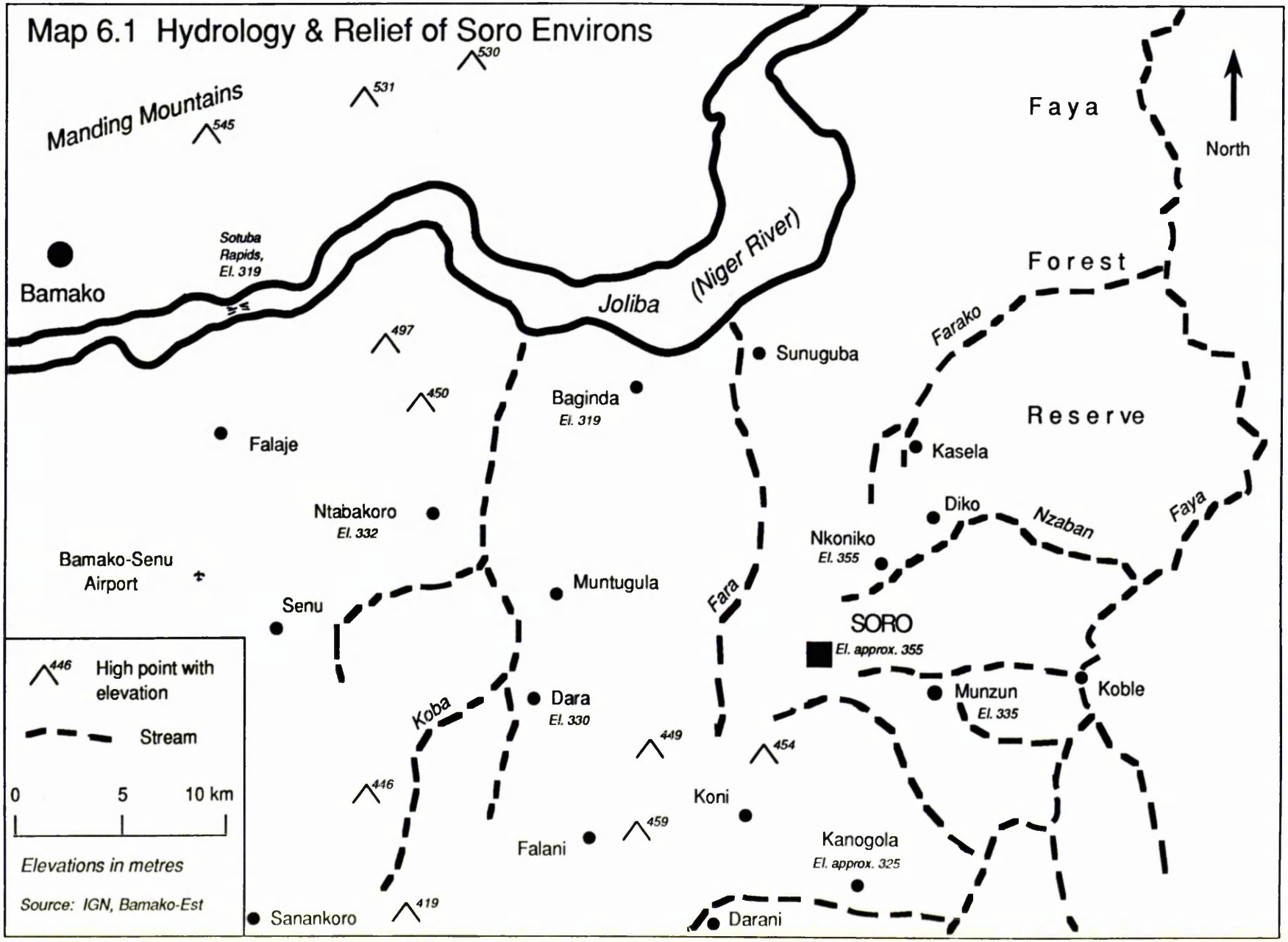
7. The river flowing from the Futa Jalon to the inland delta is the Joliba in Bamana. Mungo Park noted this in 1797. However, this river became known to European explorers as the upper Niger.


Map 6.1 Hydrology & Relief of Soro Environs
Manding Mountains
530
531
545
Faya
North
Forest
Reserve
Sotuba Rapids, El. 319
Bamako
Joliba (Niger River)
497
450
Baginda
El. 319
Sunuguba
Farako
Falaje
Kasela
Ntabakoro
El. 332
Diko
Nzaban
Faya
Nkoniko
El. 355
Bamako-Senu Airport
Muntugula
Fara
Senu
SORO
El. approx. 355
Munzun
El. 335
Koble
Koba
Dara
El. 330
449
454
446
Koni
459
Falani
Kanogola
El. approx. 325
419
Sanankoro
Darani
446 High point with elevation
Stream
0 5 10 km
Elevations in metres
Source: IGN, Bamako-Est

of central Soro. Soro is on the leftbank of a streambed (*kò*[8]) at the point where the upper catchment basin first narrows into a single, definite channel. From Soro, the streambed leads south and then southeast to the Faya.

During the higher rainfall period of the 1950s, the streambed regularly filled with runoff during the wet season sufficient to have standing water for several months. In 1987, small pools formed intermittently in the channel, but were no more than 10 metres diameter within at least two kilometres of Soro. The local hydrology is very important to the dry season vegetable farmers. Wells are dug where the water table is highest which is invaribly in or alongside the streambeds. The location of gardens follows the course of the streambeds (Map 8.1). Farmers are exploiting the subterranean water and the lowland soils of the streambeds to raise crops dependent upon a constantly moist soil. Streambed gardening is one example of the specialised exploitation of micro-ecological zones in the Soro area.

ii. Micro-ecological zones: plant associations and soils.

The savanna vegetation around Soro includes grassland, parkland, and wooded forest. Biogeographers have classified the zone as the Guinea Zone in both English and French

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8. The Bamana word *kò* is translated to French as *marigot* (Bailleul 1981:110). According to Le Petit Robert, *marigot* is a Carib version of *mare* (Fr. pool, pond). In English, no suitable single word translations are available. The *kò* is a watercourse that will fill with water during some rainy seasons. It often has little or no stream flow. It is an intermittent stream.

(Keay, Aubreville et al. 1959), or the *domaine soudano-guinéen* in French (Granier 1980)(cf. Barth 1986:95). The origin of savanna vegetation is often described in terms of climatic and pedological factors, especially by writers concerned with South American savannas (Cole 1987:334-335), or, with special reference to Africa, it is described as an anthropogenic vegetation, owing both origin and maintenance to human activity, especially fire (Cole 1987:335; Keay et al. 1959).

Burning savanna wood and grassland is believed to be an ancient practice in western Africa (Advisory Comm. Sahel 1983:25). Except for controlled burns, bush fires are illegal in Mali, though the practice continues. Herders burn grassland to promote pasture by clearing woody underbrush. Historically, hunters have burned areas to flush out animals. Certainly, repeated burnings can alter the vegetation climax of an area. On the poorer, gravelly soils a burn may take much longer to recover than on deep, rich soils. Species more common in areas with less annual precipitation may colonise burned areas that are degraded. The often mentioned and ill-defined process of 'desertification' is sometimes thought to be related to repeated burnings and vegetation change toward less diverse speciation and more sclerophytic species (Cloudsley-Thompson 1977).

Streambeds, river banks, and lowlands can develop a gallery forest vegetation. Contrary to the degraded, gravelly, lateritic, burned zone, gallery forest has been seen as a vegetation type with more in common with the

Guinean forest and humid tropical forests further south. Some consider it a vestige of the more humid forest that covered the region now supporting the West African savanna during a moister period in the past (Cole 1986). Streambeds provide a refuge for plants adapted to a moister environment.

These streambed (*kò kònò*) areas are under increasing pressure by farmers clearing gallery forest for crop cultivation in lowland soils (Krings 1987). Farmers short of cash are trying to capitalise on expanded markets for fruit and vegetable production by expanding commodity production in lowland, moist areas that have supported the greatest diversity of flora and fauna, and have easiest access to subterranean water. The expansion of mango orchards is part of this trend. In 1987, one Soro farmer planted a hectare of mangoes, and three others each planted fifteen or more trees.

At the same time as pressure from agricultural activity increases, the decline in precipitation since the 1950s has affected vegetation regeneration, most notably by a decrease in the area covered by plant species dependent on moister conditions. In Soro, aerial photographs from 1957 show a clear outline of the streambeds, lined on both sides by mature dense vegetation. In the 1974 aerial photograph, these strips of vegetation are more narrow, and in some places, broken. Mango trees planted in the 1950s in lowlands are more mature. From our observations on the ground in 1987, the vegetation along the streambeds had not degraded sig-

nificantly since 1974.

Table 6.4

Five Bamana Micro-Ecological Zones at Soro

1) *kò kònò* 'in the streambed'
Characteristics: standing pools during rainy season (it was formerly the rice growing area), high water table, household wells and gardens, snakes, lizards, rich bird life, hedgehogs, trees, grass for grazing.

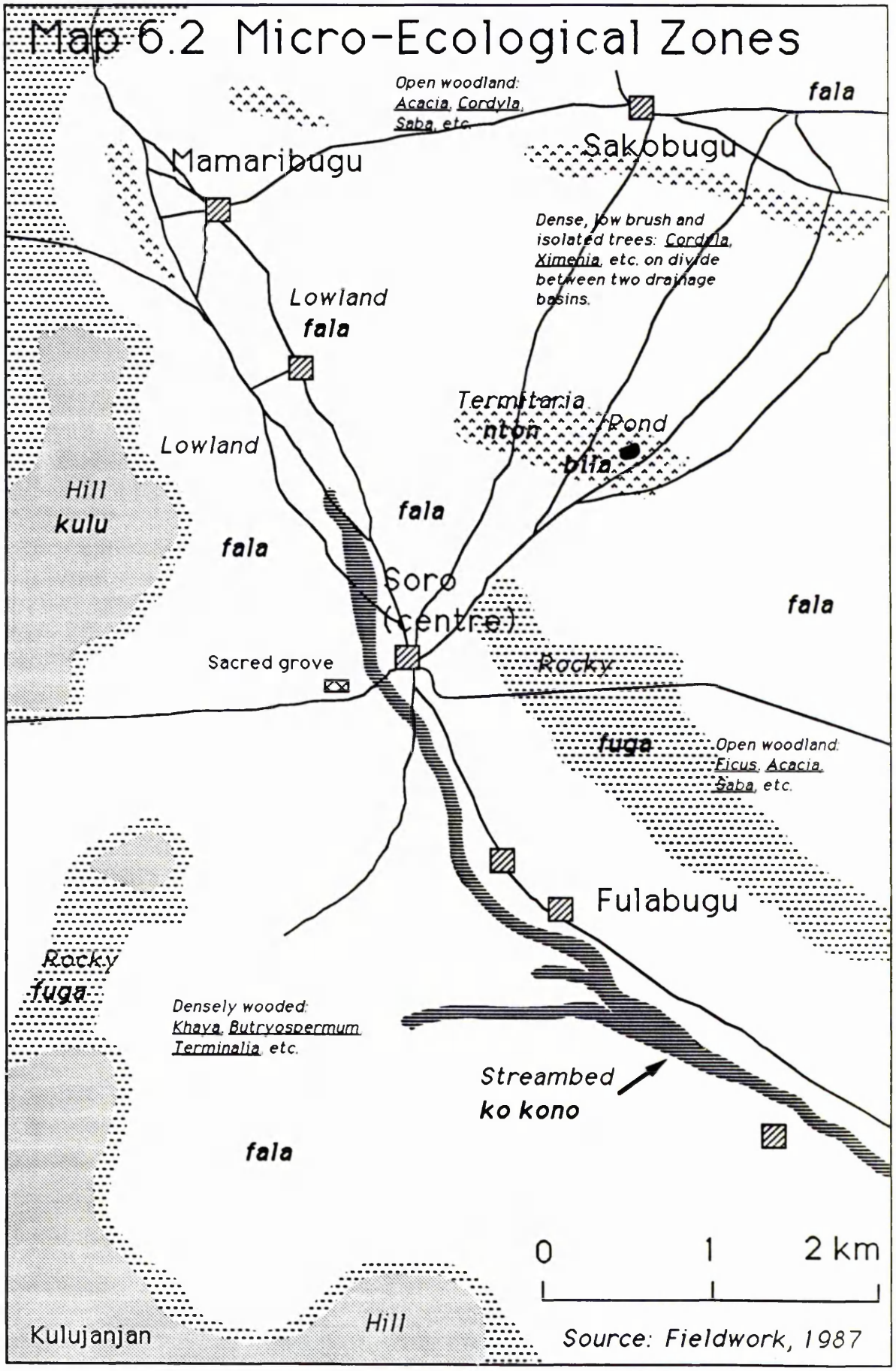
2) *fala*
Characteristics: deep soils, no standing water or rarely, fields and gardens, pasture, similar fauna to the *kò* type, but drier so trees change to a) shea, Senegalese mahogony, tamarind, and Ficus spp. and in drier, higher areas b) *dugura* (Cordyla pinnata), *ntonkè* (Ximenia americana), *wòlò* (Terminialia spp.).

3) *fuga*
Characteristics: less often fields than *fala*, longer fallow, firewood cutting, different birds, trees different--*nsaban* (Saba senegalensis), *ngiliki* (Dichrostachys cinera), *ntonkè*, *dugura*, Acacia spp.

4) *nton* 'termitaria' and *bila* 'pond'
Characteristics: often open, or grassland, often burned, *ntiiribaara* (Cochlospermum tinctorium); pasture during wet season attracting livestock, animals, birds --herons, ducks, plovers; lilies and grasses, not farmed, open meadow.

5) *kulu* 'hill'
Characteristics: hillside and hilltop, laterite exposed, gravelly, little grass, but trees--*kungosiranin*, (Sterculia setigera) birds--owls, standard-wing nightjar.

To describe this diverse landscape, the Soro farmers have a vocabulary of terms which refer to soil, vegetation, and landform types (see Appendix B). In Table 6.4, I have outlined the five principal micro-ecological zones distinguished by residents of the Soro area, and in Map 6.2, I have shown their location. Most dryland farming takes place


Map 6.2 Micro-Ecological Zones
Open woodland:
Acacia, Cordyla,
Saba, etc.
fala
Mamaribugu
Sakobugu
Dense, low brush and
isolated trees: Cordyla,
Ximenia, etc. on divide
between two drainage
basins.
Lowland
fala
Termitaria
nton
Pond
bila
Lowland
Hill
kulu
fala
fala
Soro
(centre)
fala
Sacred grove
Rocky
fuga
Open woodland:
Ficus, Acacia,
Saba, etc.
Fulabugu
Rocky
fuga
Densely wooded:
Khaya, Butryospermum,
Terminalia, etc.
Streambed
ko kono
fala
0
1
2 km
Kulujanjan
Hill
Source: Fieldwork, 1987

in clayey-loamy lowland (*fala*), though I witnessed some fields in neighbouring villages on rocky (*fuga*) land. All dry season market gardens which must have wells are located in the streambed areas (*kò kònò*). Fuelwood and wild fruit collecting occur across all zones except Zone Four, the open termitaria (*nton*) and pond (*bila*) area, where trees seldom grow. Zone Four is, however, a favourite area for hunting.

Most agricultural soil is a rich loam with pockets of heavier soil with a higher clay content. These soils are found in the *fala* area along the right side (west) of the streambed and at Mamaribugu and Sakobugu, each of which are in flat, broad catchment basins at the head of streams. The soil types on which the various households farm do not vary greatly. However, there is little question that the households resident for the longest period farm on the most appreciated soils (I, II, IV, VII, IX, X, XI). The greatest soil differences are between the planted/fallow areas and the soils avoided by farmers. The gravelly and lateritic soils not farmed form a limit to the arable land.

When compared with the soils of Ntentu near Buguni (Brasseur 1961:618), the Soro Bamana soil typology is somewhat different. Of the eight types Brasseur lists, four are used mutually: *fara* (an alternative pronunciation of *fala*), *cèndugu*, *tomodugu*, and *sununkun* which is not a true soil but a midden mound, compost, or organic fertiliser. The other four listed by Brasseur were unknown in Soro: *biradugu* (like dugufin?), *bèrèkun* (probably bèlèdugu), *mburedugu* (where *nbure* grows?), and *ngurindugu*. To the north in

Beledugu, Teme (1985) lists just three soils: *bèlè, fala,* and *jè* which is described as fine, flat, deep, not clayey, and good with tractors.

3. Pasture, Timber, Collecting, and Hunting.

The savanna of the Soro area discussed in the last section is a natural resource base for the growing of crops, and also provides grazing land for livestock, as well as habitat for plants and animals that are used as tools, building materials, foods, medicine, and fuel by the farmers.

i. Livestock (*baganw*) grazing and pasture.

Grassland in the bush at Soro is used by the ten cattle owning households as pasture. Some herders are believed to light bush fires to improve pasture by clearing low scrub growth and inducing grass growth. Seasonal change affects the quality of grass available for livestock grazing. When grass is in short supply, the cattle owners hire a herder to take the cattle to better pastures. In 1987, about a third of Soro's herd spent the dry season in the Buguni area. Other cattle owned by village households were kept in the vicinity of Marakakungo, 40 km northeast. Still others were kept in the village. Seasonal long distance travel to rich pastureland is common in inland western Africa (see Bassett 1986).

Those cattle in the village were given water drawn from wells. Toward the end of the dry season, herders and mem-

bers of cattle-owning families went out to the bush to cut fodder for the cattle weakened by the heat and diminishing food supply. Corrals built of branch fences in the bush and in fallow fields prevent cattle from straying at night. In addition, the corrals are a good source of manure that is concentrated and can then be carted to gardens or fields where it is most needed. Passive manuring, the herding of animals on a fallow dry season field, is common practice. Once the rains came in June, most of the cattle owned by Soro households were brought back to the village from distant pastureland. The herds were closely watched and kept away from cultivated areas. In addition, corrals were built to hold the cattle during the night.

Grievances between cattle keepers and farmers are common in Mali. In Soro, several farmers complained of sheep or cattle eating their crops. In one case, cattle had broken out of a corral during the night and wandered on to the field of a cattle-less farmer, and the field of a farmer from an adjacent village. The cattle damaged several square metres of millet fields. The farmers were understandably furious, with the Soro farmer demanding cash indemnity and the farmer from the other village lodging a complaint with the chief of Soro.

All forms of livestock are investment capital, with the most valuable the big oxen used in ploughing. Cattle, goat, and sheep ownership is a sign of wealth. The exact number of livestock that a farmer owns is, therefore, not public information. At the same time, it is hard to hide a herd

unless it is not on village land. In Soro, as in the village near Wèlèsèbugu[9], few people were interested in talking about the number of cattle, goats, and sheep they owned. In Table 6.5, I have estimated[10] the number of domestic animals owned by village residents. Half the cattle were owned by one household. Of the approximately 300 remaining cattle, 30 belonged to the chief's resident cattle herder. 91% of the other 270 cattle belonged to only eight households.

Table 6.5 Livestock Ownership

	No. Head
Cattle (*misiw*)	600
Goats (*baw*)	100
Sheep (*sagaw*)	>200
Donkeys (*faliw*)	5
Horses (*sow*)	1

The investment value of cattle as insurance against crop failure was made clear by one farmer. In 1984 when the millet and sorghum stocks were low, he sold four bulls (*nturaw*) for 525,000 Malian francs[11] in order to pay for grain. All cattle owners use their herds in this way. Today, the herds are growing, making up for losses during the drought years. Cattle are generally not slaughtered for

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9. In the village near Wèlèsèbugu, the discrepancy between the number of cattle enumerated on the tax roll (few) and those within view at any moment (many) was astonishing.

10. These data were collected from personal observation of livestock in the village and interviews. Whenever I saw a herd of livestock in the village with a brand or herder I recognised, I would inconspicuously count them.

11. The Malian franc was valued at 0.5 the value of the CFA franc. It was abolished at the end of August 1984.

household consumption. When a cattle owner slaughtered a cow the day before the Festival of Id-ul-adha (*seliba*), families purchased the meat.

The use of the bush as pasture for livestock is an integrated part of the farming system. The bush provides grazing land for cattle which are an investment of surplus crop production, and can be used to avert the risks of production failure in the crop growing sector. The oxen which contribute manure and draught labour to the farming system also depend on the savanna ecosystem for pasture. As grazing land for cattle, which provide inputs of labour and fertiliser as well as serve as an investment, the role of the bush as pastureland is a resource for the village economy.

ii. Harvesting timber and building supplies.

As in the case of the other bush resources, the timber and building supplies are primarily for subsistence but can become commodities when harvested and crafted into goods of saleable value. Housing materials such as straw (*cii*) for roofing and wooden beams for structural support or the construction of trestles (*gaw*) come from the bush. Clayey soil for brick making is usually found near houses so that the bricks do not need to be transported a long distance from the site where they are made to the construction site where they are used. Most building and repairs take place during the dry season months after the harvest and before the next planting season.

In Soro, another significant user of timber is a car-

penter who makes doors and other wooden goods requiring straight sawn cuts. A 35-40 year old man who worked in the household and personal fields of his father plus in his own personal field during the wet season, also worked in his shop throughout the year. The carpentry supplemented his income from his wet season market garden, and took the place of a dry season garden. He would take the cart (*wotoro*) belonging to his household out to the forest near Kulujanjan to select timber trees, especially *dogora* (Cordyla pinnata) and *shyò* (Isoberlinia spp.). His clients were from Soro and neighbouring villages.

iii. Non-domesticated foods and medicines.

A wide variety of wild edible foods are known to Soro farmers and are harvested in the bush to supplement their diet and, in some cases, income. The availability of such foods depends on the season, each species having its own flowering and fruiting periods. The shea (Butryospermum parkii) is probably the most prevalent of these foods and is discussed separately in the fourth section. Others, like *dogora* (Cordyla pinnata), *ntònkè* (Ximenia americana), *nsaban* (Saba senegalensis), *nbure* (Gardenia spp.), *nèrè* (Parkia biglobosa), *ntama* (Detarium senegalensis) and *sira* (Adansonia digitata, the baobab) are no less important (See Appendix B for description and use).

Each of these was seen in markets, but the price is usually very low. While collecting firewood in the bush, women pick the fruit, or leaves in the case of baobab, to

give to their children, and then sometimes try to sell the rest in the markets. In times of agricultural failure, bush plants become an especially important source of nutrition. In particular, one farmer referred to the role played by *nbure muso* (Gardenia erubescens), *ntabakunba* (Detarium senegalensis), *nporon*, and *nkèkè* during the famine of 1945 that resulted from a locust infestation. In more recent years with low rainfall, *dogora* (Cordyla pinnata) fruit has been incorporated into sauces in June and July.

Almost every plant can have some healing, poisoning, or magical power in the Bamana plant world (Kane 1979). The word for medicine (*fura*) is the same as the word for leaf, such is the closeness of the pharmacopoeial and botanic worlds. Countless shrubs are used as washes for various health problems. The specialists in plants and remedies use the bush as a living storehouse of medicine (Thoyer-Rozat 1981, Imperato 1977). Some remedies have proved their efficaciousness through time and are widely known and accepted (e.g. anti-fever jun)(Dalziel supplement 1983). Others are the specialties of local herbalists (*furakèlaw*) and have spiritual power if not medical healing potential (see limited listing, Appendix B).

iv. Tree tenure.

Although the last chapter showed how the non-cultivated lands are considered part of the collective land of the village under the authority of the village chief (*dugutigi*), some tree species are held privately. The collective land

covers most of the uncultivated land that produces all the village fuelwood and considerable commercial fuelwood sold out of the village, plus foods, medicines, and raw materials for shelter, tools, and other goods.

Privately owned trees include those '...trees that individuals plant in compounds, gardens and fields....' (Thomson 1987:212) In this way, private plants are for personal use. In Soro, the most important private tree species was the mango. The heads of at least three individual fields were extending their mango plantations in 1987, planting orchards of up to 1.00 ha, protecting slips (*kuw*) from goats and watering them during dry periods. Other planted species included baobab (Adansonia digitata) which, as in other Bamana villages, was inherited by the household as a whole (Lewis 1979:51).

In Soro, there was no evidence of planted shea (Butryospermum parkii) trees, but, like other useful species it was protected from cutting. My enquiries into shea tree tenureship produced two responses: a) the trees belong to the whole village and anyone can collect fallen fruit under them, and b) they belong to the head of the field in which they are growing. Observations of women collecting shea in July and August confirmed the first, and suggested the second also operated. Shea trees in fallow or bush land were said to be open to anyone in the village.

Indeed, we sometimes rested in the shade of a shea tree in a particularly shea-rich area that was the chief's fallow field. We regularly saw girls from Household I collecting

there, but also noticed members of Households II, XX, XXI, and XXII. Household II is headed by a younger brother of the head of Household I, so access could still be through lineage ties. The other three households are the most recent immigrants to the village who have the weakest links to the land in terms of time in the village. They, too, could have limited access to shea fruit zones.

Trees in planted fields, like the planted field zone as a whole, are under the tenureship of the field holding household. Collecting tends to be oriented toward and around fields anyway, when women and girls combine their trips to the field with food or water by collecting baskets of fruit. Lewis reported that in Dukolomba fruit from bush trees belonged to anyone collecting it, and trees in a field belonged to the field head (*forotigi*) (Lewis 1979:52).

v. Honey and hunting.

In addition to trees and shrubs, honey and the meat of wild birds, mammals, and reptiles are also important resources found in the bush. The resource function of hunted animals is reflected in the Bamana expression *kungo sogo*, in which *sogo* 'meat' refers to the animals.[12] The village outside of Wèlèsèbugu was a great honey producer during the month of March, contributing to the Wèlèsèbugu market's reputation for honey. One 25 year old man had about twenty hives (*ŋunuw*) in the bush which he would har-

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12. This is similar to the English expression 'game' when applied to hunted animals.

vest in the cool of a moonlit night when the bees were less active. Honey is much appreciated, both for its flavour and for its reputed medicinal properties.

In Soro, fewer *ŋunuw* are kept, but some smaller *barow* 'gourds' are placed in trees to collect honey. March is the chief honey month because of the flowering of plants such as shea, *nsaban* (Saba senegalensis), *nèrè* (Parkia biglobosa), and certain acacias that fruit during the wet season. The wet season itself is the other major flowering period, but beekeeping is more difficult due to the growth of underbrush, the leafing out of trees, and most significantly, the precedence taken by field labour.

Hunting is also a primarily dry season activity exploiting the resources of the bush. Hunters form a special, exclusively male social group in Bamana society (Jara 1978). In Soro, four men aged 35-45 years were regular hunters. They used shot guns. The best were known for their skills in tracking, locating habitat for certain species, imitating birdcalls, 'reading' the actions of other wild animals, and general knowledge of bush ecology and dangers.

One week in April (6-12 April 1987), two of these hunters and a friend from Bamako who made use of his car in hunting shot 31 *wòlòw* 'partridges' (Francolinus bicalcaratus) and two *sonsaninw* 'hares' (Lepus aegyptius). Some *mankalanin* 'antelope' (Sylvicapra grimmia) is sold when shot, but otherwise most is not exchanged for cash. Other animals hunted included antelope, porcupine, and Guinea fowl (See Appendix B). Boys aged 9-12 supplement their meat con-

sumption at meals by hunting birds, lizards, and rodents with slingshots and traps.

4. Fuelwood and Shea Butter Production.

i. Fuelwood.

Soro farmers exploit the savanna woodland as the source of their fuel for heat energy and as a commercially valuable resource. A wide variety of species are considered high quality firewood (see Appendix B). These woods are made into fuelwood for local consumption as the sole cooking fuel and as a commodity to sell to Bamako wood merchants. This resource depends on the abundance of woody vegetation on non-cultivated village land. Its value as a long-term source of energy and cash income rests on the regeneration of the savanna forest in the same way that the dryland agriculture depends on a fallow period.

The sustainability of Soro's fuelwood production is difficult to assess without more data on the regeneration rate. From observation in the field and of aerial photos from the 1950s and 1970s, the forest is not recovering at the same rate it is being cut. Bamako is a growing city and its consumption of fuelwood is growing. Since this is the chief factor in the growing collection of fuelwood from the Soro area, it threatens the long-term stability of the forest.[13]

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13. Just 15 km east of Soro lies the Faya Forêt Classée which includes 80,000 hectares, where hunting, farming, and fires are not permitted. It was created in 1927 as the Réserve de Bamako covering 15 km on either side of Faya (ANM, I-R-331).

Women woodcutters dominate fuelwood production. In 1987, 87% of the fuelwood workers were women. (Table 6.6). Nearly all women old enough to carry a branch of wood and physically fit were involved in fuelwood production. The chief exceptions were in FulBe Households XX and XXI. Subsistence production was organised by *ga* 'kitchen, hearth'. Commodity production, however, was organised around individual married women (*babonda*). Unmarried women, and in some cases men, processed wood that contributed to their mother's commercial wood pile.[14] The unmarried men produced wood for their mothers only on an occasional basis, 4-6 times a year. The only other involvement of men in fuelwood production is in the specialised making of charcoal which I will explain below in the sub-section.

Table 6.6

Fuelwood Producers (not including charcoal)

Social Group	No. Workers	% Fuelwood Producers
Married women	68	59
Unmarried women	32	28
Married men	0	--
Unmarried men	15	13
Total	115	100%

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14. We knew of one exception to this pattern. An eighteen year old unmarried women who produced wood for herself.

a. Firewood.

Groups of women, usually defined by household and age group, sometimes spend 2-4 hours in the morning and often again in the afternoon in the bush cutting and collecting wood. Their only cutting tools are axes (*jelew*), made by local blacksmiths (*numuw*). They carry the wood back to a household wood pile on their heads wrapped in a cloth.

At the wood pile, thick branches and logs are split and trimmed to a length of 50-60 cm, about an arm's length (Photo 6.1). The split wood is then tied into a compact bundle (*dògò siri*[15]) about 15-19 cm in width and height, and weighing 2-3 kg. The *dògò siri* is primarily a volumetric unit. About 36 *dògò siriw* make one stere. Each bundle is tied with strips of fibrous bark, usually of the *nyama* tree (Pilostigma spp.), that is soaked in water just before tying so that it is supple and easy to tie.

Soro women produce 80-200 bundles per dry season month (Nov-May). In Table 6.7, I have shown this range in corresponding units of weight, volume, and monetary value. Some women can produce as many as 500 bundles in a month. The individual production varies depending upon household responsibilities, farming, marketing, and health. At 2-3 kg per bundle, these women are producing between 160-240 and 400-600 kg/month and up to 1000-1500 kg/month from November through May. This is equal to 2.0-5.5 steres and up to 14

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15. The literal translation of *dògò siri* is 'tied wood', but can mean a bundle of cut firewood, or a unit of firewood for sale. Both *lògò* (Malinke) and *dògò* are used in Soro. Soro is in a Malinke-Bamana language frontier zone.

steres per dry season month.

Table 6.7

Range of Monthly Fuelwood Sales per Production Unit[16]

Weight	Volume	Value
200 - 500 kg	2.0 - 5.5 steres	1600 - 4000FCFA
max. 1250 kg	max. 14 steres	max. 10,000FCFA

Over this seven month period, annual production of fuelwood in Soro is currently between 78 and 266 t, or 952 and 2618 steres.[17] This range is broad but nonethless shows the great amount of wood produced. A much more thorough study concentrated on fuelwood production would be necessary to arrive at a more accurate figure. In Table 6.8, I have estimated production figures based on these ranges.

Table 6.8

Estimated Commercial Fuelwood Production

Per Production Unit		
290 kg/mo	3.2 steres/mo	2,400FCFA/mo
2.0 t/yr	22 steres/yr	16,800FCFA/yr
Total Village (68 producers)		
20 t/mo	218 steres/mo	163,000FCFA/mo
140 t/yr	1500 steres/yr	1.1 mil FCFA/yr

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16. A production unit consists of a married woman and unmarried daughters old enough to help.

17. USAID estimated that national fuelwood consumption in 1975 was 408,568 steres (cited in Koenig 1986:171).

Interviews with women field heads[18] revealed that wood sales were the most important source of cash income for women aged 18-55. Each bundle sold for 20FCFA.[19] Using this figure, I have been able to estimate total income earnings from fuelwood sales. The monthly total per production unit of 2,400FCFA in Table 6.8 is an estimate. Some of the stronger women with one or two daughters assisting could make more. The older women, especially those without daughters at home, make less.

Soro women sold their wood directly to wood truck drivers either in the village or at collection sites in the bush. Two principal kinds of transporters came to the village: small Peugeot *bâchés* 'canvas covered pick-up trucks' and very large lorry and trailer rigs owned by Bamako based wood merchants. A completely loaded *bâché* contained about 500 bundles, worth about 10,000FCFA to the producers (Photo 6.2). A fully loaded lorry could hold about 3000 bundles worth about 60,000FCFA wholesale.[20]

During May, in the weeks before the wet season when wood production nearly halts due to the producers turning to

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18. Since the focus of my research was field rather than commodity production or wood and I was particularly concerned with the heads of fields who were mostly men, some young women wood workers were not included in the interviews. Outside of interviews, however, in less formal circumstances, my wife and I learned about firewood production through conversations and observation.

19. The price was said to improve during *fobonda* to 25FCFA.

20. This is a wholesale price. The retail price on the streets in Bamako ranged from 150 to 200FCFA. At this time, the particular *dògò siri* was selling for 175FCFA.

Photo 6.1
Splitting Firewood

Photo 6.2 Transporting
Firewood from Soro

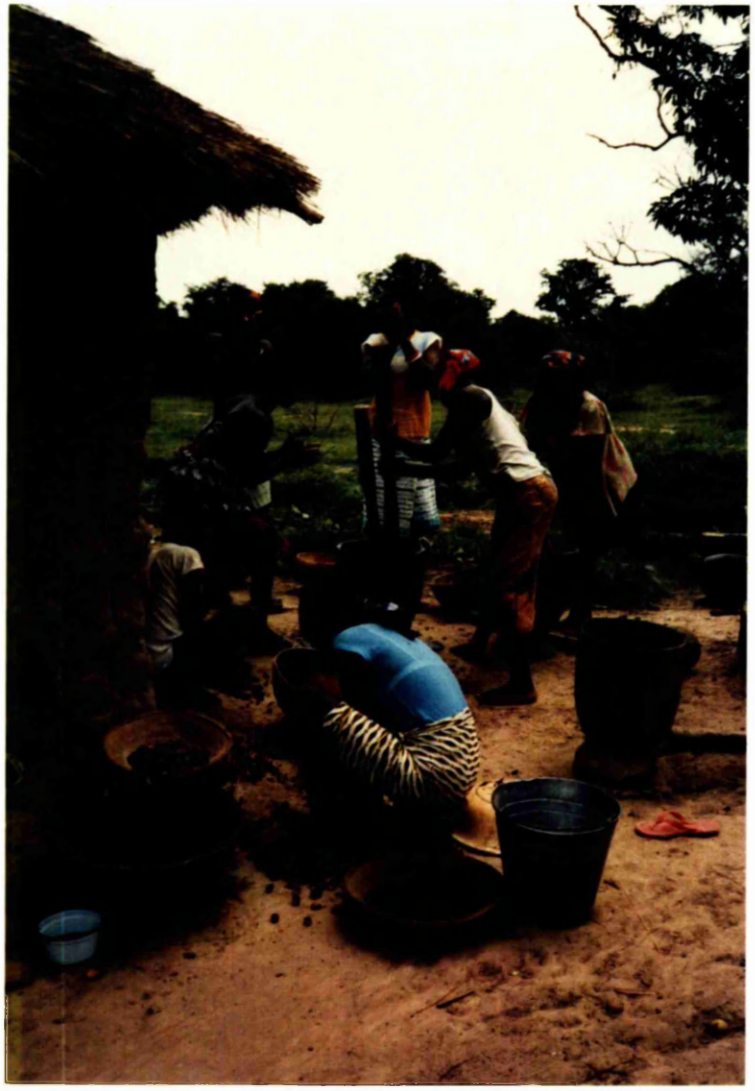

Photo 6.3 Breaking Shea
Nuts to Make Shea Butter

farming and shea butter production and the deterioration ofthe dirt roads over which the transporters must travel, *bâchés* came through the village nearly every night. They would not always stop, bound for other villages beyond Soro. Often they would stop for certain households to purchase wood in order to complete their load.

On 21 May, one such lorry arrived in Soro at 8 am, stopped long enough for ten unmarried young men (aged 16-23) to climb into the trailer, and continued south in the direction of Kulujanjan. Women were already at the wood collection site. They cut wood and the men carried it to the lorry and loaded it. Women who had been chopping wood in the village and younger girls who had been doing housework brought food out to those working in the bush. By 2 pm, the lorry had returned to the village centre completely filled. The women were paid in the bush. They, in turn, paid their sons back in the village.

All women working in the same meal preparation rotation (a single *ga*) would collectively provide wood to meet the fuel requirements of the kitchen preparing the compound meals. With data from three locations in Mali, Koenig (1984) found that domestic fuel consumption ranged from 1.41 kg/person/day in Buguni, to 2.25 in Nioro, to 2.56 in San. As she points out, however, there are great differences in rates of consumption per person depending on the number of persons sharing a single kitchen. Since Soro had large *gaw* relative to the examples in the Koenig study, the lower per person figure is probably more appropriate as a rough es-

timate of Soro fuelwood consumption. Using this figure, Soro harvested approximately 370 T per year, of which nearly two-thirds (62%) was for domestic consumption and over one-third (38%) was sold.

Time spent harvesting and processing fuelwood varies between production units and over the year. Without a detailed study of work time related to fuelwood production such as the one we carried out on farming, I cannot give precise labour allocation figures. Koenig (1986) has done this as part of a time study per person covering all daily activities. Considering that fuelwood production was not a commercial activity in her study villages, however, the figures are not comparable with activity in Soro. Instead, I will present the general annual pattern for fuelwood production, and then the daily hours available. This available time will show the flexibility of fuelwood production as a cash-earning activity, which can fit into the daily life paths of women.

I have used a seven month (November-May) production period as the basis for calculating the estimates of fuelwood production. This period is defined by the marked decrease, or absence of production, during the wet season when the fuelwood workers turn to farming and shea butter production. Not until after the agricultural and shea butter seasons do women resume full scale wood harvesting. To prepare each kitchen for the period when workers do not gather wood daily, stocks for domestic use are built up in May. Similarly, traders must prepare for the closing of

their source of goods by buying more before the rainy season. May is, therefore, the most active wood harvesting month.

Daily time allocated to fuelwood production was nil during the height of the agricultural season and highest just prior to it in May. East of Soro around San, Koenig (1986:173) found that a woman spent a daily average of 0.28 hours collecting wood for household use only (1986:173).[21] The time spent by Soro women on fuelwood production during the dry season is much greater because so much of it is spent on commodity production.

In Soro, as in the Koenig study villages, the collection and transport back to the village of wood was not always done in discrete blocks of time. But, perhaps because it was such an important commercial enterprise, it filled the non-domestic work portion of daily work. In fact, women who shared meal preparation in a single kitchen (*ga*) were able to use the days when they were freed from domestic meal preparation to *'taa kungo kònò'* 'go to the bush' for up to 6 hours a day. In this way, their fuelwood production units benefited from an economy of scale at the level of common *ga*.

With the exception of the seasonally fluctuating fuelwood/farming/shea butter processing strand of their annual labour activities, women's work is much more regular than men's. Cooking, obtaining water, and other household tasks

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21. San is in a similar vegetation zone, but is much further from Segu and Bamako firewood markets than Soro is.

occupy a regular block of time. In the Koenig study (Koenig 1986:172), these tasks took an average of about 70% of a seven hour day. The remaining 30% of the day was spent doing 'productive work' and 'getting wood'. If we take the 70% as a rough guide to the regular portion of domestic work women do, then the average weekly time available for fuelwood production (or agriculture or shea butter production depending on the season) is just under 15 hours. In Soro, women who farmed spent an average of just over 13 hours per week, or just under 30% of their average total weekly time spent working (domestic and non-domestic), in the fields during the time allocation study in the wet season.

With commercial fuelwood production on the scale of 140 t/year, it is not surprising that women invested 85,000FCFA in the re-routing of the road from the Bamako - Segu highway to Soro at the beginning of 1987. Although male market gardeners did not help finance this road work, they, like Popkin's 'free-riders', benefited from the investment through the improved access to their plots by Bamako-based traders. The sum spent on road work is equal to about 8% of the total estimated value of the 1987 harvest of fuelwood. This reinvestment in production is similar to the value of reinvestment by market gardeners (Ch. VIII).

The small scale and weak development of women's involvement in food commodity production may be in part attributable to the opportunities in fuelwood sales. When asked why they were not investing time and effort in dry season market gardening, wood cutting women responded that

the water is too deep in the wells at that time and it is too much work on top of the daily cooking and housework. In contrast to market gardening, fuelwood commodity production integrates well with the daily 'life paths' (Pred 1984) of women, which included the existing requirement of domestic fuelwood procurement. Women thus dominated fuelwood production in terms of labour time and income partly because the activity complemented their daily life pattern, allowing them to exploit the economic opportunity caused by the proximity of a savanna forest and the Bamako fuelwood market.

b. Charcoal.

Occasional charcoal making by men is the only male fuelwood production activity outside of the occasional hiring of sons to load fuelwood transport lorries.[22] Unlike women's fuelwood work which takes place as a group, even if each earns cash as an individual based on her own production, charcoal is usually produced by an individual man. A charcoal maker selects a tree in the bush, cuts it, and lets it smolder in a fire pit.[23] In Soro, about 15 such charcoal 'projects' took place during the year, involving fewer than ten men. Dense woods are best for charcoal making, hence the preference for shea, *siri* (Burkea africana), and *gele* (Prosopis africana).

As an example of a charcoal project, a 28 year old

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22. The main buyers of charcoal are Bamako's tea drinkers.

23. This process is described by Foley (1986).

married Soro man spent 3 May plus the evening of a second day cutting and preparing two sacks of charcoal from a tree that had earlier been cut and burned. He transported the two sacks 30 km by bicycle to Falajè to sell to a charcoal dealer for 1350FCFA each. Unlike the daily fuelwood work of women, this kind of production is irregular and regarded as something to do for a little cash during the dry season. When clearing a new field in June, another man filled four sacks with charcoal from trees felled in his newly cleared household field. On 16 June he borrowed a bicycle and took two to Falajè where he sold them for 2750FCFA.

One family in Soro had no land and did no farming. It was entirely dependent on fuelwood sales to earn cash to buy food. Consisting of a 29 year old man, a 25 year old woman and their two children under five, the family was given temporary residence in a room in a Soro household. While the woman looked after the children, did housework, and produced fuelwood for sale, her husband made charcoal and took it in to Bamako for sale. They were itinerant, having been in Soro only a few months. They came on the recommendation of a friend who said that they could make money in the area by selling fuelwood.

ii. Preserved trees.

The chief species that crosses the field - bush divide

is the shea (*si*, Butryospermum paradoxum).[24] Every household field in 1987 contained at least one shea specimen, and many had the aspect of shea orchards with grain fields intercropped (Table 6.9). Although the shea butter tree is not the only tree species withheld in fields, it is the most common in the Soro area. About 80% of the trees preserved in Soro fields were shea, but it should be noted that one field hectare could have thirty trees and another none at all. The average was about 12 trees per hectare. Northwest of Bamako in the Sudan zone with a slightly different species composition, Ohler (1985:17) found that about 60% of the trees in fields were shea, and 3-14, average 7, trees were withheld per hectare.

Table 6.9

Trees Preserved in Household Fields

	% fields with specimen	% trees withheld
si (Butryospermum paradoxum)	100	80
wòlò (Terminalia spp.)	18	5
ntomi (Tamarindus indica)	18	≤1
npeku (Lannea spp.)	9	≤1
sutoro (Ficus gnaphalocarpa)	9	≤1
nsira (Adansonia digitata)	9	≤1
jala (Khaya senegalensis)	9	≤1
balansan (Acacia albida)	5	≤1
nsèrèninbilen (Ficus glumosa)	5	≤1
nèrè (Parkia biglobosa)	5	≤1
jimijana (Entada africana)	5	≤1
jun (Mitrgyna inermis)	5	≤1
bunbun (Bombax costatum)	5	≤1
mangoro (Mangifera indica)	5	≤1
buyaki (Psidium guajava)	5	≤1

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24. The English word for *si* is shea, one of the few English words known to be derived from a Bamana word. The French word *karité* is derived from the Pular word *karrei* (ANM, 3-R-1).

The shea is not planted. The distribution and density of shea trees depends primarily on the micro-ecological zone where the field is located. They prefer deep and loamy-clayey soils: the same soils that Bamana farmers use for dryland grain farming. The distribution of shea trees in Mali correlates well with the historical pattern of dryland grain farming (Ruyssen 1957:279-280). Ruyssen goes on to say that: 'In the shea zone, there are no good lands <u>without</u> shea.' (Ibid: 282). Another factor in the local occurence of shea and other trees in fields is the cultivating strategy of the farmer. If the farmer mounds, more trees usually remain in a field. If the farmer's primary cultivation technique is ploughing, then fewer trees are likely to remain in the field.

Considering its prevalence in savanna farming systems, it is surprising that the shea has not received more attention in intercropping studies. The shea fruit and oil production of many 'grain fields' is considerable, but difficult to measure since the fruit from fields is mixed with fruit from trees outside the cultivated area in the bush. Ruyssen (1957:163) found that shea trees in cultivated fields produce more fruit than those in uncultivated areas, implying that for higher production the tree depends on human intervention to manipulate their ecology. Trees in fields may benefit from protection against fires and less competition for soil nutrients from other trees and herbs (Ibid:286-287).

The trees appear to play roles of shading to retain soil moisture during intermittent dry spells. The shea leaves collect on the field surface and decompose there, or are mixed into the mounds or ploughed into ridges where they contribute to the organic content of the soil. The leaves aerate the often compact clayey soil, and release nutrients brought up from the soil substratum by the trees' roots. Ruyssen (Ibid:287) did not note the influence of the shea tree on crops besides the observation that millet, sorghum, and groundnuts all grew well beneath it, especially when compared with crops beneath the *nèrè* (Parkia biglobosa), which ironically has foliage that allows more light to penetrate to the ground.

Shea production can be a major activity of women in years of bumper harvests. Fruit from trees in cultivated fields represent only a small part of the fruit harvested. In July and August when the fruit is ripe women of all ages collect the fruit that has dropped beneath the trees. Unmarried girls with no farming responsibilities may collect fruit up to seven hours a day during the height of the season in a good year. Women working in fields combine trips out to the fields with collecting a basket on the way back to the house. Several *musokòròbaw* 'elder women' (e.g. in Household X, XIII) commented that they do not bother with their own fields when the shea fruit crop is abundant. For this reason, the one from XIII did not plant grain in 1986.

The fruit is collected at the house. Some enterprising

women immediately process it into oil to sell at a higher early season price (Photo 6.3). Most of the fruit, however, is piled in courtyards and in pits where it ferments until after the weeding in fields is completed and women have more time to devote to shea oil/butter (*si tulu*) production. The process is long and arduous. Ruyssen (Ibid:292) estimated that one woman needed two full days to produce only 3-4 kg of shea butter using a rolling pin and flat rock as a press. The elaborate process of oil extraction and shea butter production has been thoroughly described elsewhere (Fleury 1981, Busson 1965, Ruyssen 1957).

Although women in Soro presently have no alternative to the time-consuming process of oil extraction by hand, in the village near Wèlèsèbugu where we began the fieldwork in February 1987 a state agency was helping women to improve shea oil production. In March, women in one residential quarter of the village purchased a shea oil (*si tulu*) extraction machine that was installed by the Centre for Women Rural Development Agents (CFAR) in Wèlèsèbugu (see Traoré 1986). The women of the quarter paid for half the cost of the machine at the outset, agreeing to repay the other half to the CFAR over the next two years with the earnings from shea oil sales. Such cooperation between farmers and a state agency to improve shea oil production helps farmers increase their cash income and decrease arduous manual tasks. At the same time, the state benefits from increased production of a valuable commodity.

Shea and other trees found in fields were not cut be-

cause of their economic value. When the colonial government prohibited the cutting of certain trees in 1914,[25] it was only bringing under state control a prohibition already sanctioned by Bamana belief and vegetation management. Sometimes shea trees are cut, especially in areas where tree clearance is necessary for tractor ploughing. In Soro, cutting shea is not unheard of, but cutters must have a good reason given the economic importance of the tree.

The tamarind (*ntomi*), the hunter's tree, is not cut. Such trees as the tamarind stand in *fala* land on protected sites, often providing refuge for several trees. The baobab provides leaves for sauces and is encouraged in gardens.

5. Bush Resources, Farming, and Women.

The concept of natural resources from non-cultivated land in a peasant farming system 'subsidising' agricultural produce is not new, nor is the concept restricted to a particular region of the globe. Calling the Papua New Guinea Highlands subsistence systems 'resource-based' after Hyden (1980:14-16), Grossman summed up the bush resource - ecology - technology link in peasant communities:

> ...they [peasant communities] depend almost entirely on the local resource endowment, are highly subject to environmental vicissitudes, and lack the techno-

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25. Articles 2 and 3, order of 8 April 1914 prohibited cutting of shea and kapok, but allowed for exceptions authorised by the lieutenant governor; further orders in 1915, 1918, 1920 made further prohibitions; in 1926 ten species were illegal to cut, while another 18 could be cut with a permit and the payment of a tax--receipts 1927-32; an urban firewood belt was established around Bamako and two forest reserves were set up (ANM 3-R-1).

> logical buffers available to more scientifically complex agricultural systems. (Grossman 1984:111)

Local extractive resources can provide the means to subsidise households, especially the poorest. In the Maranhao state of Brazil, Hecht, Anderson, and May (1988) examined the role of a secondary palm forest in both the maintenance of the ecosystem and in the socio-economy of the farming system. They found that

> A low input, sustainable agricultural and household production system is almost unimaginable in the region without the contributions from successional fallows. (Hecht et al. 1988:25-26)

The same could be said for southern Mali.

Hecht et al. (Ibid.) identify two forms which this subsidy takes: 1) accumulation of biomass during fallow which becomes a source of fuelwood and soil nutrients, and 2) the harvest and sale of forest resources as an important income source, <u>especially for women</u>. Since extractive resources are often on public lands, social groups with the least control over the means of production have access to them. As I noted in the introduction with regard to the gender division of labour, women have relatively limited control over labour (Guyer 1984:381). Women often dominate informal sector employment, such as peasant exploitation of extractive resources, where little investment is necessary (Heyzer 1981: 23). In Soro, a comparable 'bush subsidy' to farming exists, and moreover it is an aspect of the unequal gender distribution of labour.

The evidence from Soro supports a general model of labour time allocation to explain why women farmers dominate the sale of bush resources. A large proportion of women farmers' weekly work time varies little throughout the year. This fixed block of time includes activities such as procuring water, preparing meals, and caring for children. As presented above, these domestic and reproduction-related activities take up approximately 70% of women's work week time. The work activities of the other 30% of the time change seasonally: in broad terms, agriculture and shea butter production in *samiya* and *kawule* (June-October), followed by fuelwood production and wild fruit collection in *fobonda, fonènè,* and *tilema* (November-May), although there is considerable overlap.

These particular activities on which women concentrate their remaining 30% of work time offer cash-earning opportunities while integrating well with the time and place requirements of the other 70% block of time. Women are responsible for the provision of fuelwood to meet their households' needs. Since it is already part of their work requirements, women's development of fuelwood commodity production is merely an expansion into the commercial sector of a household supplying role. The women who supply fuelwood to their households know the paths in the bush, the stands of good quality wood, and the use of the axe. They need only to increase their trips, their wood procurement, and prepare the wood for sale to make some cash. The only requirements are physical energy and time. The time is

available from the 30% of the work week that is not fixed and can include non-household responsibilities.

Women farm during part of the year. In conjunction with farming, they collect shea fruit in the fields and in the bush. Their daughters help them collect, just as they help them carry, cut, and tie fuelwood. Shea fruit collection during July and August when the trees are bearing coincides with trips to the field to meet the peak agricultural labour input requirements of sowing and weeding the fields.

In sum then, women's income-producing work, as Heyzer (Ibid.) showed, is especially prevalent where women can extend their domestic responsibilities to earn cash. Some resources of the bush thus subsidise farming as commodities for acutely labour constrained farmers, i.e. women. In addition, bush resources can be transformed into energy for cooking, the provision of supplementary and emergency food, pasture for cattle, building materials, medicine, and other supplies. Through the rotation of fields and fallow land, farmers manage the agroecology of the bush (*kungo*) and fields (*forow*). In this way, they maintain soil fertility for the fields and gardens as well as the ecosystem upon which all of their productive activities depend.

Today, the demands of production are putting ecological stability in conflict with sustained bush harvesting, dryland farming, and market gardening. Less than 100 km east of Soro, the successful promotion of cotton cultivation by the state rural development programme and international capital is causing the loss of gallery forest and field

trees with subsequent erosion (Krings 1987:58-9). The exploitation of extractive resources is in conflict with bush clearance for expanding state-led agriculture and the burgeoning Bamako urban population which relies on fuelwood from the urban perimeter.

Conclusion.

Savanna has been conceptualised in a number of different ways: determined by climate, transitional between desert and forest, maintained by grazing animals, and anthropogenic due to fires and/or bush fallow cultivation. In this chapter, I have recognised these biogeographic determinants of the vegetation type, but I have taken a different approach in order to emphasise the relationships between farming and the material resources of the location.

The farmer, in this chapter, is first and foremost a land manager who selects sites for field cultivation and for bush extraction. Where the bush yields are high and beneficial in subsistence returns or cash income from sales, it is kept intact. Certain species are never cut due to their high use or spiritual value. Where the means of production increase the potential of field cultivation, as with greater area cultivation with oxen drawn plough, or deeper and more complete, and fast tilling with a tractor drawn plough, farmers reduce the area of bush to expand field area to a maximum. An expansion of field area implies a reduction of forest/bush land.

In this way, the 'savanna' is like an expansive garden

in the hands of farmers, and the 'cultivation' of the three zones--bush, field, garden--are complementary. At the watering points of that garden are the meticuously tended market gardens, cultivated year-round, with their great diversity of cultivated and selected, usable plants which will be discussed in more detail in Chapter VIII. Also carefully farmed, but on only a seasonal basis due to the limitations to grain production posed by the seasonality of rainfall, the fields are mid-way in an intensive to extensive cultivation continuum. At the non-cultivated end of the plant produce spectrum are the bush resources.

The physical variables in agriculture, such as climatic factors, soil, and vegetation are not, therefore, considered solely as components of a matrix for human action and social relations. They are enmeshed in ecosystemic relations; part of which is human reliance on natural resources. The Bamana farming system relies on three such resources: rainfall sufficient for crop development and recharging groundwater; soil developed and rehabilitated through a bush fallow system of cropping; and diverse plant and animal resources that are both an integral part of the ecology and make a substantial contribution to subsistence and commodity production.

The Bamana farming system itself is not unique in relying on ecological processes of natural renewal. Other bush fallow systems in other ecosystems in other world regions have similar or comparable characteristics (Ruthenberg 1980). Malian farmers' methods of maximising the utility of the West African savanna have been emphasised to show how

farmers in specific ecological conditions have adapted to production constraints. The successful transformation of local savanna resources depends on farmers' ability to overcome such factors as variable rainfall and finite fertile land. Using their knowledge of the local ecology, they secure harvests using minimal technological inputs.

Not far from Soro in the Baginda area, as I showed in Ch IV, and in many other parts of Africa, farmers regularly use scientific data and tools to provide a 'technological buffer' to 'environmental vicissitudes'. They have regular access to agricultural research, meterological information, soil studies, irrigation water, herbicides, fertiliser, and tractors. Soro farmers, though, work within more limited technical constraints. To do this, they produce subsistence and commercial crops in a cultivated (field) sector of land, but also a considerable surplus of extractive products from the bush. This kind of extractive production has been shown to provide a subsidy to bush fallow agriculture (e.g. Hecht et al. 1988; Grossman 1984). My work in Soro confirms this, and also suggests that in some circumstances the agricultural system of small commodity producing peasants may be heavily dependent on the harvest and sale of bush resources.

In the next chapter, I will examine the dryland farming system which dominates agricultural land use in the area.

Chapter VII.

Dryland Farming.

The land iguana takes its body
from the place where it is reared.[1]
--Head of Household IX

In this chapter, I will show that dryland farming is the dominant form of agriculture in Soro in terms of land use and labour input during the rainy season. Some of the agronomic techniques used in this particular form of cultivation will be discussed with reference to their role in assuring a harvest. The agronomic and labour use strategies may provide clues to the rationale for such a farming system. I am trying to answer the questions: why are farmers farming the way they do, and what are their objectives? These questions will be answered with reference to three themes: 1) soil/ecological constraints, 2) the domestic economy, and 3) the role of social-political structure within the household.

The orientation of household field (*forobaforo*) production toward the corporate needs of the compound points to the role of the household head (*dutigi*) in production. The work of John Lewis (1979) has shown the interest patriarchs have in producing not only crops on an agronomic basis, but 'producing' descendants who can maintain the lineage, and the social structure of the compound and village. These twin goals of production are historically rooted in Bamana

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1. *nkoro b'a mòyòrò fari ta.*

farming communities dating to at least the Segu state era. The farming unit formed out of members living in a shared household continues to orient its production towards the sustenance of the corporate group.

The dominant farming system in Soro and practised in various forms throughout the savanna in a broad latitudinal belt extending from Senegambia through Chad and Sudan is a dryland bush fallow (Ruthenburg 1980). Indeed, this farming pattern which relies on an annual monsoon type rainfall for the production of grain has been proposed as a distinct agrarian system found in many places around the world (Hill, P. 1982). Soro's dryland cropping occupied over 90% of the non-fallow field use in 1987. The millet-sorghum-cowpea association covered the greatest proportion of cultivated land area--146.9 ha. or about 82% of the land area cultivated in 1987. Foods made from those crops constituted the dietary base (Hill, A. 1985; Mondot-Bernard 1982).

The particular forms of dryland bush fallow depend on numerous variables, including the length of the wet season, integration of herding and farming, and extent of commodity production. In Soro, where a millet-sorghum-cowpea crop complex characterised the principal dryland production, considerable market gardening of tomatoes and other vegetables has developed. The vegetable gardening and dryland bush fallow exploit distinct ecological niches, and at present do not compete with one another for land resources. The market gardening can be spread throughout the year, tapping groundwater resources for irrigation. Time - space analysis re-

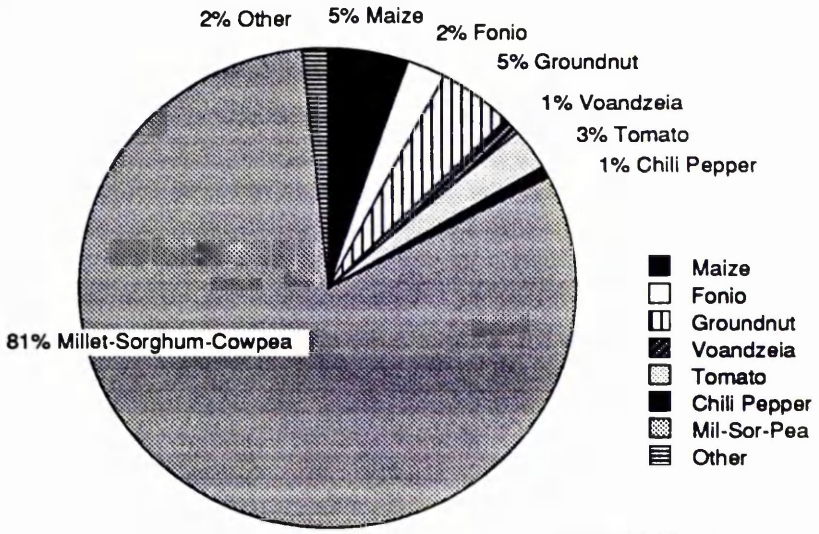
veals a distinct pattern for market gardening from that of dryland farming. In Chapter VIII on market gardening, I will show how dryland farming and market gardening are complementary farming systems, though potentially competing for land and labour and ultimately threatening to the patriarch-dominated household unit.

In this chapter, I will emphasise the dual agroecological and social/political reasons for growing certain crops in a particular manner. Most agricultural labour, but not all, is provided by the household members. Production is primarily oriented towards meeting non-cash, domestic needs. Historically, the household farm probably developed to feed the compound and assure self-reliance (Roberts 1987, Lewis, 1979, Ernst 1976, Labouret 1934, Monteil 1924). Important new forms of farming organisation, however, may spring from it, particularly in the allocation of land and time to individual field production oriented towards extra-household demand, including urban markets. Family unity, respect for age and status, and other social mores and beliefs may be changing as new forms of farming organisation develop.

1. Crop Land Area.

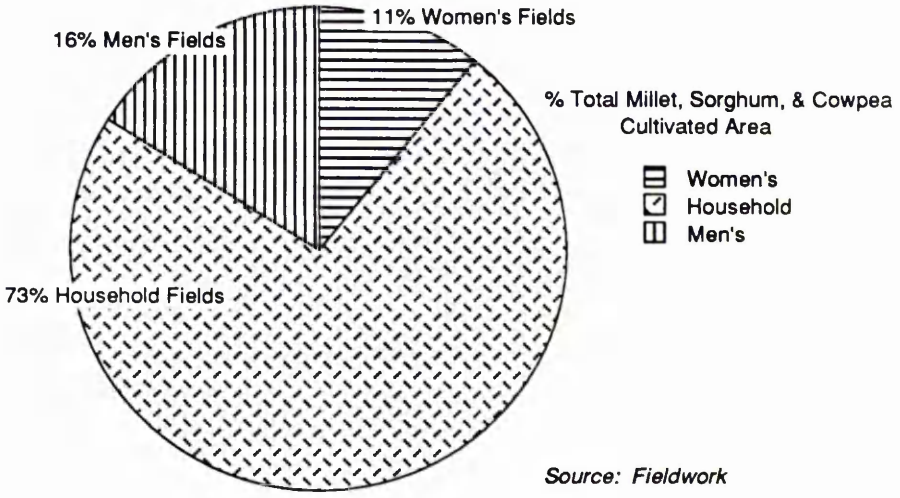
The greatest area of Soro cropland was under the millet-sorghum-cowpea crop complex, most of which consisted of fields intercropped with the three crops in the same parcel at the same time. A total of 146.9 ha of total village field area supported one or both of these grains plus cowpea, or 82% of the total cultivated area in 1987 (Fig. 7.1).

Fig. 7.1 Total Cultivated Area By Crop Type, Soro, 1987



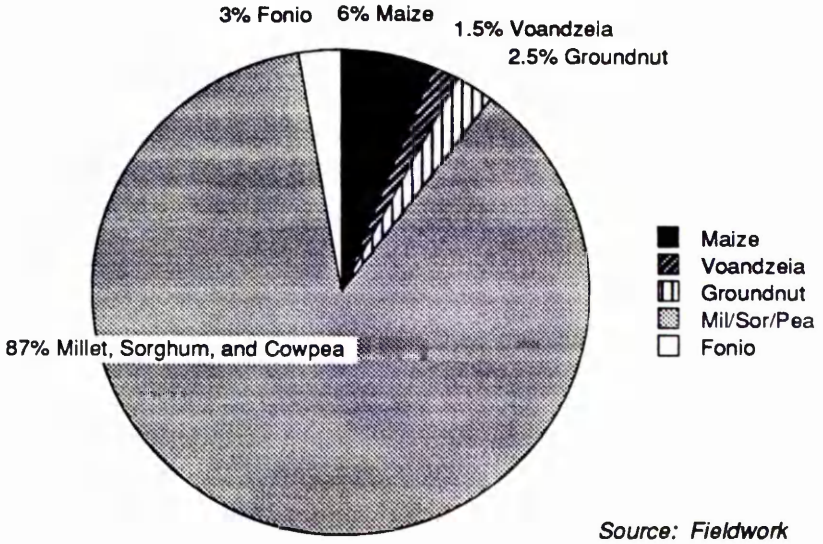
Source: Fieldwork

Fig. 7.2 Total Millet, Sorghum, & Cowpea Area By Field Type, Soro, 1987



Source: Fieldwork

Fig. 7.3 Total Household Field Area By Crop Type, Soro, 1987



Source: Fieldwork

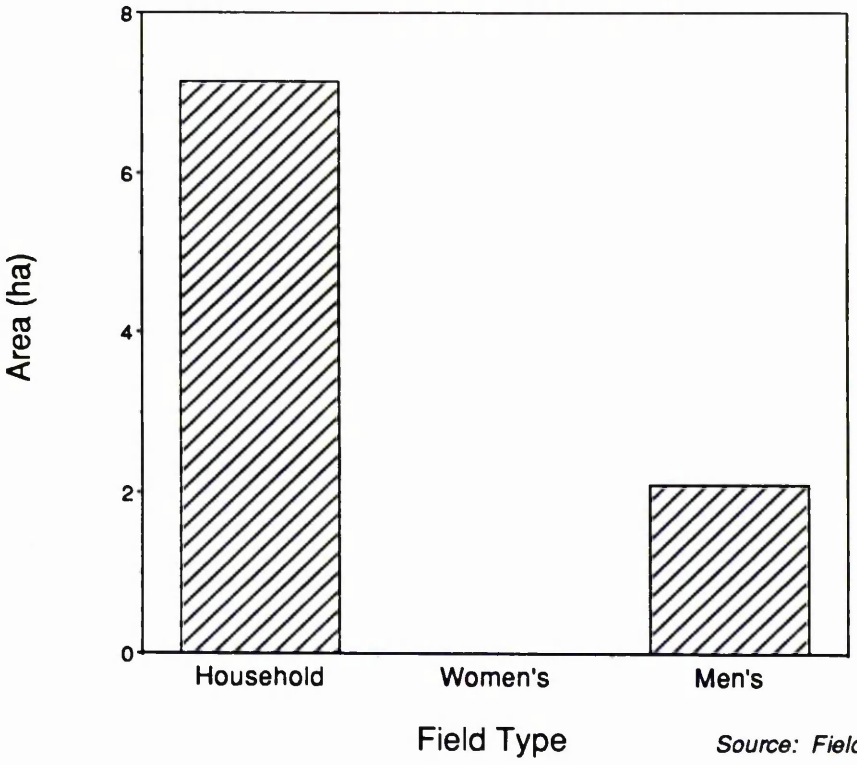
This figure compares with over 90% in Ntentu in 1957 about 150 km to the south (Brasseur 1961:645), 72% for the Kulukòrò Region (AS 1987:100) and a general figure of 80% for the West African region (Richards 1983:63). The major crops of Soro thus are a part of the broad agricultural complex stretching across western Africa.

Of the total village millet-sorghum-cowpea area, 73% was in household fields (*forobaforow*), 16% in men's individual fields, and 11% in women's fields (Figure 7.2). On household field land alone, the millet-sorghum-cowpea area accounted for 87% of the area (Figure 7.3). The household field thus appears to be particularly oriented toward growing these crops.

Maize fields occupied the second most extensive crop area in the village, but the proportion of the total area was very small when compared with the millet-sorghum-cowpea area. Maize was grown on 9.4 ha or about 5% of village cultivated land. This compares with 5% of village land in the Ntentu study (Brasseur 1961) and the official figure for the entire Kulukòrò Region of 6% (AS, 1987:100). I found no maize growing in women's fields, 20% (1.8 ha) in men's individual fields, and 80% in household fields (7.5 ha) (Figure 7.4).

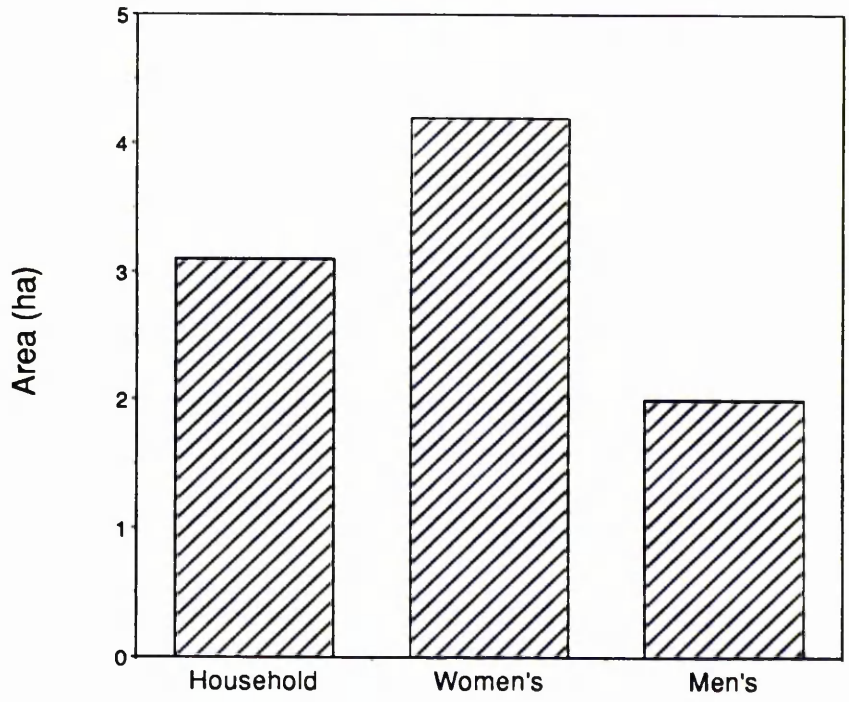
Fonio occupied the least area of any of Soro's grain crops: 4.4 ha or less than 2.5% of total village cropland. In fact, only 36% of the household fields had any fonio at all, and only two of the 24 (8%) personal fields (*jònforow*) operated by men that contained grain had fonio fields. No

Fig. 7.4 Maize Area by Field Type



Source: Fieldwork, 1987

Fig. 7.5 Groundnut Area by Field Type



Source: Fieldwork, 1987

women's fields contained fonio. The Kulukòrò Region as a whole was estimated to have 4% of its cultivated area in fonio fields (AS, 1987:100). Overall village production of fonio in 1987 was not more than 3 tonnes.

Two ground nut[2] crops were a part of Soro's dryland farming complex in 1987. Groundnuts (*tiga, tigè*, Arachis hypogaea) occupied 8.9 ha, only slightly less than maize, which equalled 5% of the cultivated land. According to national agricultural statistics, groundnuts occupied 6% of the Kulukòrò Region's cultivated land (AS, 1987:100). The other ground nut, Voandzeia subterranea, or Bambara groundnut (*tiganinkurun*), occupied close to 1% of the total village crop land, and production amounted to just over a tonne. Voandzeia occupied only 0.2% of Kulukòrò Region's cultivated land, according to the official figures. In terms of crop land area, it was not a major crop in 1987, but it is a common element in field rotations and is appreciated for its taste.

One or both of the ground nut crops were present in half of the household fields. Four household fields had a Voandzeia field, totalling 1.9 ha. Only one other farmer grew Voandzeia in Soro in 1987, the holder of the largest personal field area in the village. Groundnuts (Arachis) were grown on only 36% of the household fields. They were

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2. Ground nut as two words will refer to the two crops (Arachis and Voandzeia) which produce 'nuts' underground. Groundnut, as a single, compound word, will refer to Arachis (peanut in American English). I will refer to Voandzeia as such, rather than the confusing name of Bambara groundnut.

much more common in a woman's individual field. Out of 30 women's fields that contained a grain crop and/or groundnuts, 19 had groundnuts (63%). Women's fields accounted for 4.0 ha (45%) of the total village groundnut field area, household fields 2.9 ha (33%), and men's individual fields 2.0 ha (22%) (Figure 7.5).

The dryland crops thus consisted of four grains, two ground nuts, and one pulse. The millet-sorghum-cowpea association dominated the crop land area, and it was even more important when the household field area was considered alone. The crops occupying the next largest areas were maize and groundnuts, but their total area was substantially smaller than the millet-sorghum-cowpea area. Maize, like fonio, was not grown by women. Groundnuts, on the other hand, were grown predominantly by women.

Relationships thus appear to exist between crops and field types. Household fields are dominated by millet, sorghum, and cowpea, but contain other crops as well. Women's fields contain a large proportion of the groundnuts, as well as grains except for maize and fonio. Men's personal fields support grains, including maize and fonio. This pattern suggests that certain farmers, represented by the 'field types' favour certain crops. I will return to this topic in the course of looking at the agronomic methods of farming. Following the natural pattern of cultivation, I begin with the selection of a field site and the question of fallow periods.

2. Field Site Selection and Fallow.

The selection of a field site is based on a variety of factors, most importantly linked to the fertility of the soil and therefore the potential yield of the land parcel. The agronomic suitability of a site requires a reading of the land and vegetation. The presence of certain species, especially grasses can be a signal to a farmer of soil fertility.[3] In this savanna bush fallow system, 'virgin' land previously not cultivated or affected by human activity is regarded as a myth, both by geographers (Gallais 1984; Brasseur 1968) and by Bamana farmers.

Once selected, farmers clear a new site by cutting woody species with an axe (*jele*), preserving mature specimens of useful plants, and clearing grass (*waa bɔ̀*). Cleared vegetation is either burned in the field or harvested as wood for sale or domestic consumption. The first two years of farming a new parcel require extra effort, cutting the sprouts of woody species and general clearance of species regenerating in the newly cleared field. Often, a strip adjacent to an already existing field is cleared rather than an entirely new parcel. Farmers of 82% of the household fields cleared new strips to add on to their existing plot, ranging from 1-27% of the total area of each

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3. Bernus (1956:254) found the following plant indicators of soil fertility in a Malinke village upstream along the Niger in Guinea: a) Indicators of weakened, infertile soil--Digitaria, Paspalum scrobiculatum, Imperata cylindrica, Pennisetum; b) Indicators of rich soil--Andropogon tectorum, *gbaka*, Andropogon spp.

household's cultivated dryland area.[4] By bringing a new strip into the field at the leading edge of the field-forest boundary and abandoning a strip at the trailing edge, farmers can avoid or postpone the taxing work of clearing a completely new site (cf. Toulmin 1985:86-7, Lewis 1979:113-4).

The length of fallow varies greatly. In Soro, farmers were reluctant to define a set fallowing cycle to their dryland cropping, preferring to draw attention to the necessity of reading the land in all cases. Richards (1985) has emphasised this aspect in relation to the environmental particularities of the West Africa savanna. Some farmers put the field cycle at six to twelve years for *fala* land (Household II), with at least that period, in fallow. Brasseur (1961:648) reported 7-25 year fallows in Ntentu, the longest on sandy soils, and Jones (1970:288) estimated that a seven year cropping period was followed by a 10-15 year fallow in Joliba, but also added a cautionary note about generalisations stating that farmers rotated crops in response to small-scale soil area variations. It is difficult to comment on fallow periods without considering the particular characteristics of the land in question.

Members of Household IX claimed that they had been working the same land for sixty years. The expression 'same land' is vague, but apparently referred to the area sur-

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4. The 'cleared' land here refers to land that was fallow in 1986. Trees and other woody plants may have been cleared, or just grass. Two households (XVIII and XXII) sowed all of their crop in soil that had not been planted in 1986. They are not included in this range of the proportion of newly cleared land.

rounding the hamlet (*buguda*) settlement site. A cutting edge of field-forest frontier rotated around the perimeter of the field area, but the interior (*soforow*) of the ring had been cropped annually for sixty years. Aerial photographs from 1957 and 1974 confirm that most of the field area under cultivation today was farmed in those years, but has expanded, especially toward the south and southeast (Map 7.1).

Farmers had different ideas about the best cropping cycle. The position in the cycle of two crops, however, was unanimous. Voandzeia is grown on newly cleared land. Of the five Voandzeia fields in 1987, all of them were on land that had been fallow in 1986.[5] During the household farm interviews in May, just before the agricultural season began, representatives of half of the households referred to Voandzeia as a crop that they intended to plant (only 18% did plant). One farmer (Household V *dutigi*) commented that he would be planting Voandzeia only if the rain were especially abundant. This could be related to the ecology peculiar to the plant in that it seems to demand a constantly moist soil environment during the early stages (Soumaoro 1983). Additionally, as a consequence of a 'good' wet season, farmers would expand their cropping area, possibly clearing new tracts to take advantage of the abundant rainfall, and planting Voandzeia in the newly cleared plot.

At the opposite end of the crop rotation cycle from

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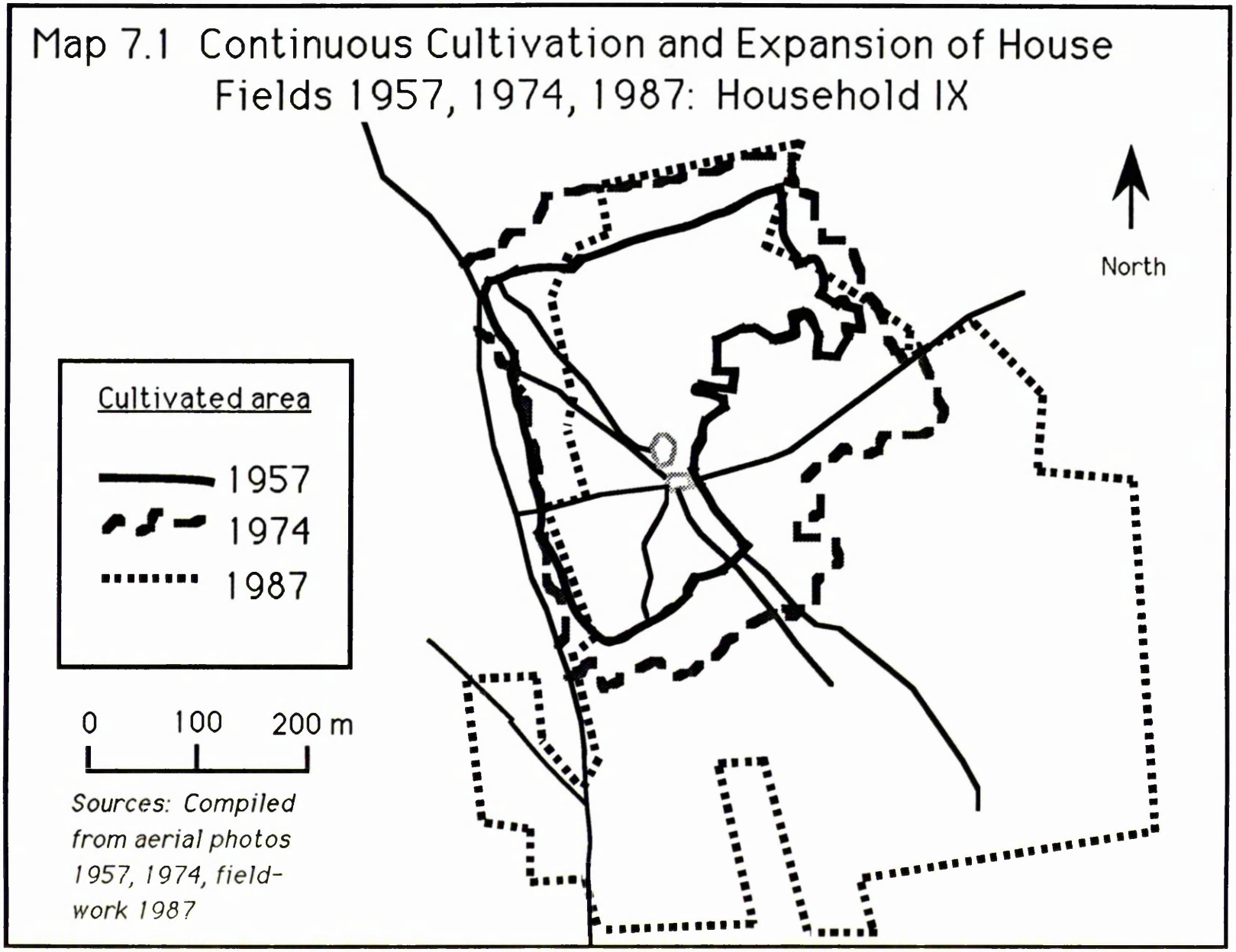
5. Lewis (1979:122) observed Voandzeia following two years of sorghum and one or more years of millet.


Map 7.1 Continuous Cultivation and Expansion of House Fields 1957, 1974, 1987: Household IX
North
Cultivated area
1957
1974
1987
0
100
200 m
Sources: Compiled from aerial photos 1957, 1974, field-work 1987

Voandzeia, fonio can be planted in relatively poor soils (Lewis 1979:129; Brasseur 1961). For this reason, farmers plant it late in the fallow cycle. The Soro fonio fields in 1987 were all on soils that had earlier supported millet and/or sorghum for 3-7 years.

Agro-ecological conditions appear to influence decisions about site selection, fallowing, and rotations. Farmers determine the fertility of soil by evaluating the viguour of the plants supported by a fallow parcel. Their decisions are based on close attention to changes of vegetation cover. Similarly, the crops that are selected for first and last position in rotation also reflect the demands of those crops on soil fertility.

3. Intercropping.

Fourteen of the 22 household fields had the millet-sorghum-cowpea intercrop.[6] Smaller households tended to plant millet and sorghum in the same field, while the larger sowed in separate parcels (Figure 7.6). The seven of the eight household fields which had less than 6% of these three crops in the millet-sorghum-cowpea intercrop tended to be large in area (>7 ha total household field) and their farmers were familiar with methods promoted by the agricul-

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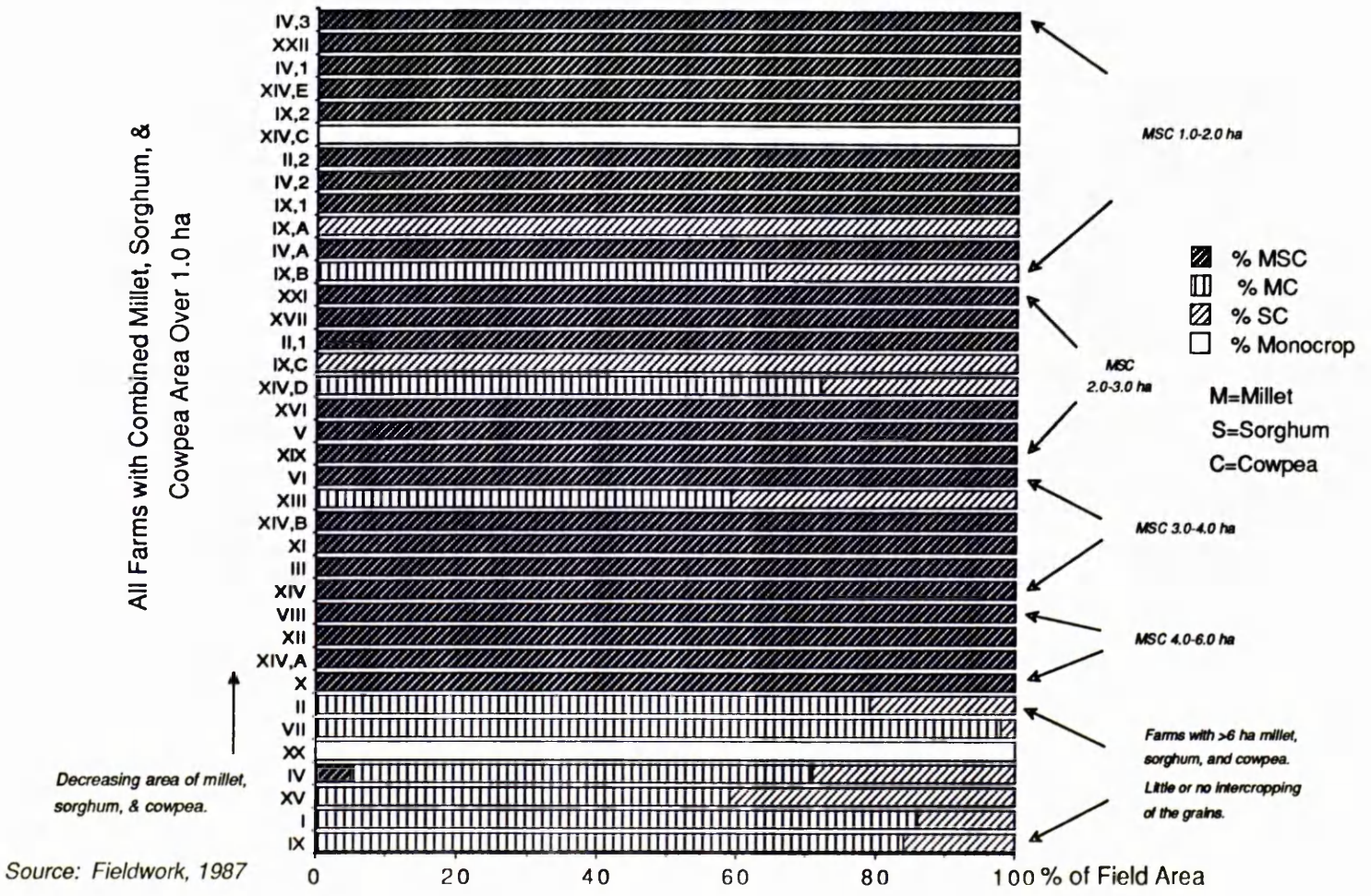
6. The eight household fields classified as 'without' the millet-sorghum-cowpea intercrop had an insignificant proportion of these crops growing together (less than 6% of the household field area of millet-sorghum-cowpea). According to the agricultural statistics for 1985, the Kulukòrò Region had 93% of the national area of this intercrop, suggesting that it is a speciality of Kulukòrò farmers. This figure is, however, unlikely to be very accurate.

Fig. 7.6 Millet, Sorghum, & Cowpea Intercrops By Farm



Source: Fieldwork, 1987

tural extension agency. The Opération Haute Vallée (OHV) 'Upper Valley Project' promotes planting in straight lines to facilitate ploughing which it considers more 'modern', and it encourages monocropping of certain crops (Min. Agr., 1986).[7] While one farmer of separately cropped sorghum and millet said that the monocropped fields made harvesting much easier, those of intercropped fields made reference to the compatibility of the grains and cowpeas, to the more efficient use of carefully weeded field space, and to intercropping as 'the Bamana way of growing grain'.

While the tabular data show that smaller producers of millet, sorghum, and cowpea frequently grew the crops together in 1987, farmers planted different varieties according to a number of factors. Each farmer sowed the proportion of intercropped seeds differently. Some had mostly millet in proportion to sorghum; some had little cowpea, while others sowed cowpea every three metres in a ploughed field or 2-3 per mound. These differences depended on soil fertility or point in the rotation cycle, seed availability, and taste preference. Some farmers designated a certain parcel for millet, but still included some sorghum in the seed mix. If the *wiyanka* sorghum variety, for example, was in abundance from the previous year's harvest then it was likely to dominate the sowing. Ultimately, farmers stated that their crop choice depended on the taste preferences of the household, especially the head of household. Cowpea-

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7. These aspects of OHV policy were confirmed in an interview 3 Feb. 1987 with an OHV official in Wèlèsèbugu.

rich fields tended to be cultivated by cowpea-appreciating households. Where the crop is entirely, or almost entirely, for meeting household subsistence needs, this is not surprising.

The three crops exploit separate microspatial niches in the field. The towering sorghum bolts first and usually is the highest. Millet grows more slowly in the early months. The two grains are quite similar, but leave space for the creeping cowpea that grows beneath the grain stalks spreading on the soil surface. Any soil cover helps to retain valuable moisture as the rains diminish in September. As a legume, cowpea fixes nitrogen, making it available to later crops in the same field parcel. Recent research on millet-cowpea intercropping in Mali has shown that by manipulating the cropping sequence, density of intercrops, and sowing dates, production can be improved (Hulet 1988). In this way, the three crops complement one another when grown in the same field.

The millet-sorghum-cowpea seed mixture was sown at the same time. Most farmers planted using a *bolèn* 'seeding stick' and *koro* 'seeding cup'[8] (Photo 7.2), though some used machetes or small hoes instead of *bolènw* and tin cans if they had no *koro*. A few seeds (2-3) were dropped into each 3-5 cm 'pocket' opened in the soil crust and then covered.

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8. The *bolènw* of Soro were made by a *numukè* 'blacksmith' in a neighbouring village of a rounded wood shaft about 50-60 cm., curved at one end to form a handle. At the opposite end, a metal tip is attached where the tool is inserted into the soil surface. The *koro* is a 10-15 cm. diametre gourd.

This method of seeding causes a minimum of soil disturbance but requires very intensive labour input per seed. Seeding in pockets is called *ka danni kè* (cf. Toulmin 1986:88, Lewis 1979: 230). In comparison to this labour intensive seeding, one farmer had an oxen-drawn seeder.

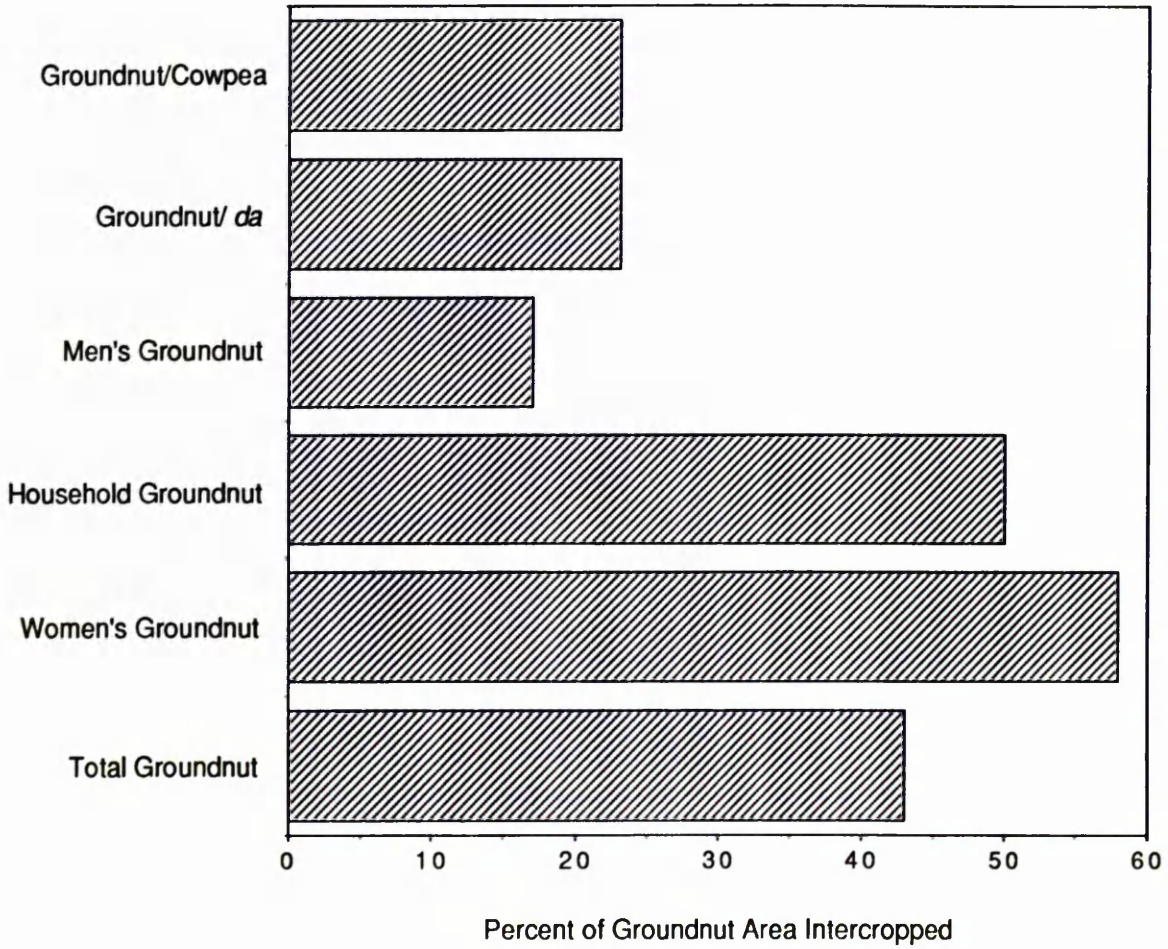
Table 7.1

Groundnut Intercrops

Groundnut-Growing Farms	No. Farms Growing Groundnuts with:					
	da	*da*/ Cowpea	Cowpea	Voandzeia	Sorghum	Monocrop
Women's (n=19)	2	3	2	2	2	8
Household (n=8)	1	1	--	--	--	6
Men's Personal (n = 12)	2	--	--	1	--	9
Totals (n=39)	5 (13%)	4 (10%)	2 (5%)	3 (8%)	2 (5%)	23 (59%)

Although groundnuts and Voandzeia were intercropped in only three fields (Table 7.1), they were cultivated in a similar manner. Some were intercropped with *da* (Hibiscus sabdariffa), but most commonly single cropped. Groundnuts were planted immediately after the initial grain sowing, between 19 June (Household IX) and 14 July, with most farmers sowing in early July. In contrast, Voandzeia was not planted until the rains were, or were likely to be, more regular between 16 July (I,3) and 9 August (XIV,A). It was the last household field crop planted. Where the two crops were in-

Fig. 7.7 Groundnut Intercropping:
By Crop Combination & Field Type



Source: Fieldwork, 1987

tercropped, the farmer planted the Voandzeia between groundnut plants that already had four or five leaves. This 'relay cropping' allowed the farmer to grow more than one crop in the same parcel at different but overlapping intervals (Steiner 1982). Groundnuts were grown with *da* in 23% of the groundnut fields, intercropped either every other plant in a row, or with *da* planted around the edge of the plot (Figure 7.7).

Both farmers' knowledge of the agro-ecological requirements of crops and the production goals of different farming units appear to influence intercropping in Soro. On the one hand, farmers' experiences have proved that intercropping improves crop conditions, as have the results of agricultural research elsewhere in Mali. Intercropping was more common in certain field types, suggesting that different categories of farmers have different objectives where the decision to intercrop is concerned. The range was from monocropping practised by large households exclusively using ploughs and familiar with fertiliser use, to more frequent intercropping in women's fields. I will look at the reasons for this after I discuss other characteristics of agronomic practices.

4. Fertilising and Plant Protection.

i. Fertilising and intensification.

Farmers not only select sites for their high soil fertility and seek to maintain that fertility through the mixture of crops on the parcel, they sometimes also try to en-

hance the quality of soil by adding nutrients. In Soro, three kinds of fertiliser were used: house sweepings (*sununkun* or *nyaman*)[9], manure, and N-P-K[10] chemical fertiliser. Certain crops received more fertiliser inputs than others. The specific kinds of crops receiving fertiliser inputs are discussed with reference to ideas about greater intensification of production in house fields than in bush fields.

Of the grain crops, maize received the most soil nutrient inputs in the form of organic waste (*sununkun* or *nyaman*), manure, and chemical fertiliser (Table 7.2). The seven households (32%) in hamlets operated a system in which the maize fields surrounded the house. Where maize was grown around the house perimeter, it received the benefits of kitchen scrap fertiliser.

Table 7.2

Fertiliser Use on Grain

	% Farms Applying			% Area Fertilised[11]		
Crop	*nyaman*	Manure	N-P-K	*nyaman*	Manure	N-P-K
Maize n=26	69	19	12	48	44	39
Sorghum & Millet n=70	0	3	1	0	1	<1
Fonio n=9	0	0	0	0	0	0

9. I use 'house sweepings', 'kitchen scrap fertiliser', and 'organic rubbish' to refer to the same thing (*sununkun* or *nyaman*): the rubbish swept out of houses daily and deposited in a heap next to the house.

10. 12% nitrogen, 22% annhydrite of phosphate, 12% potassium, 7% sulphur

11. Rates of fertilising varied, especially of *nyaman* relative to the distance from the house to the field. See further discussion in Ch. VIII.

Unlike manuring which presumes ownership or special access to one who owns cattle, the use of courtyard sweepings was open to anyone whose household had collected them in a pile (Photo 7.1). Women swept houses and courtyards twice daily, once just after dawn when the morning activities began and again in the late afternoon before the evening meal. This daily addition of kitchen and miscellaneous house waste (e.g. peelings of fruit such as mango and *dogora* (Cordyla pinnata), shea nutshells, groundnut shells, bones, hair, paper and straw) can create a significant concentration of organically rich compost. The practice of using household waste compost on fields is an old Mande agricultural technique, observed by Mungo Park (1799) in 1798.

Only three large (1 ha and over) growers of maize applied N-P-K. They were 12% of the maize growers, but because their fields were large, the area they fertilised was 39% of the total village maize. They grew large tracts with the intention of selling some of their crop. No one used chemical fertiliser on maize who did not plan to sell part of their harvest.

When millet or sorghum begin to yield poorly on a particular parcel, it is a signal to the farmer to let the parcel go fallow. Farmers use fallows rather than trying to improve the soil fertility by adding fertiliser because the pressure on land in this area has not led to a need to

Photo 7.1 Fertilising with Compound Sweepings (sununkun)

Photo 7.2 Sowing with Stick (bolen) & Cup (koro)

Photo 7.3 Thinning and
Transplanting Millet

intensify.[12] Millet and sorghum are the main grain crops, and fallow is the most important means by which to improve soil fertility. This said, the house field and bush field (*soforo - kungoforo*) dichotomy is partly based on fertilising.

As I showed in Chapter III, the distance between a 'house' field and a 'bush' field need not be great in Soro. Brasseur (1966:53) reported bush fields as far away from the village centre as 5 km, and up to 7 km, with seasonal hamlets accomodating the farmers to avoid the loss of time in travel to the field. In Chapter V, I introduced the different types of fields in terms of responsibility/ownership (*forobaforo, jònforo*). Other field names describe the crop type (*nyòforo, tigaforo*) or location (*kungoforo, soforo*), (see Appendix C on field types). Of these, the locational contrast has been equated with intensification using the same logic of the von Thünen model. Crops furthest away are the least intensively farmed and those closest in, the *soforow* adjacent to houses, are annually cropped in manured fields.

Evidence of this practice was present in nearly all households. The house fields of Households I, II, IV, XIII, XIV, XV, XVI, XVII, and XXII ringed the central Soro settlement site. During the dry season the cattle of some of these households spent most of their days on this land be-

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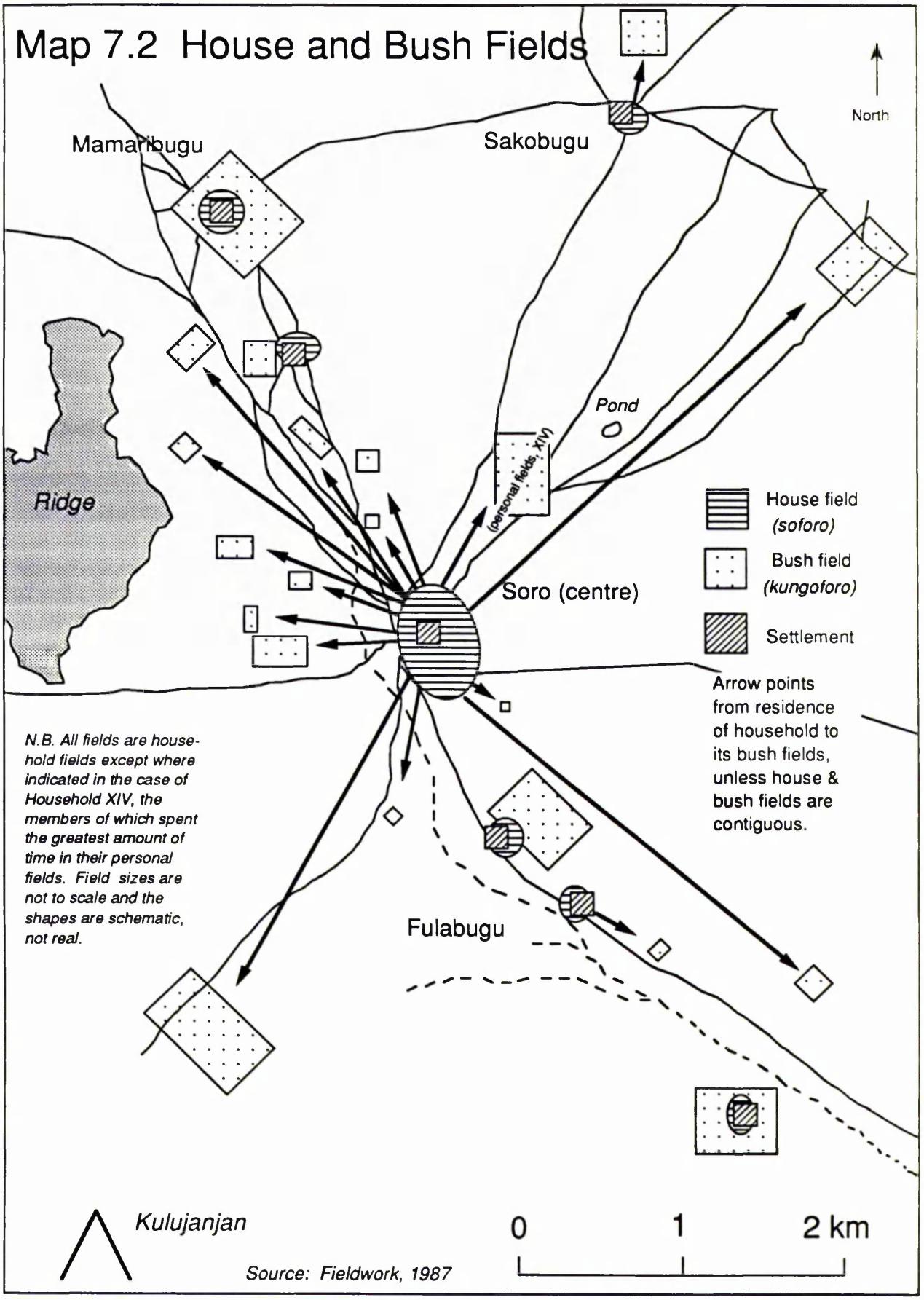
12. Investigation of Boserup's (1981, 1965) theory that increased population density leads toward agricultural intensification is currently being carried out in a variety of African locations (Kates 1987:528).

cause the household heads wanted to manure the fields next to their respective houses which they annually cultivated. Soro's dispersed population in hamlets (*bugudaw*) is a variant of this model. Each hamlet had its own house field ringing the settlement site, which if not dryland cattle pasture, was the site of household rubbish dumping.

North of Soro, in a drier region, Toulmin (1985:82) found that this model described not only intensification but also the fact that the outfields were planted in one variety while the infields tended to be planted in another. In the village near Wèlèsèbugu, I found that infields were ploughed while outfields were mounded. The infields also were manured by acting as dry season pasture for cattle which were watered at wells located at houses. Lewis (1979:235) found a similar pattern south of Segu, where sorghum house fields were manured and millet bush fields were not.

In Soro, the distinction between bush and house fields was proximity to the residence as is implied in the words themselves. My observations in Soro show that, overriding the general pattern of increased intensification toward the house site, the most important factor in determining sites of intensified production was access to high water-table land. Other factors being equal, the pattern of intensification towards the house may hold. But, where ecological factors combined with a market opportunity made vegetable gardening a prosperous activity, farmers were willing and able to travel over 9 km out to their garden plots, over twice the furthest distance to a household grain field, and


Map 7.2 House and Bush Fields
North
Mamaribugu
Sakobugu
Pond
(personal fields, XIV)
Ridge
Soro (centre)
House field
(soforo)
Bush field
(kungoforo)
Settlement
Arrow points from residence of household to its bush fields, unless house & bush fields are contiguous.
N.B. All fields are household fields except where indicated in the case of Household XIV, the members of which spent the greatest amount of time in their personal fields. Field sizes are not to scale and the shapes are schematic, not real.
Fulabugu
Kulujanjan
0
1
2 km
Source: Fieldwork, 1987

further still to take their produce to markets.

Map 7.2 shows that the households in hamlets generally had less far to travel between their houses and fields than those in central Soro. There is more pressure on the land around the centre, and therefore farmers must select field sites further away from their houses. The location of intensified cultivation need not, by extrapolation from the von Thünen-inspired theory, therefore be adjacent to Bamana houses. The hundreds of tomato farmers in the lowlands of the Faya in the vicinity of Kanògòla are evidence of a different motivation (see next chapter for more on market gardening).

In summary, crops aimed at the market are more likely to receive fertiliser inputs than household consumption-oriented crops. Maize receives the greatest fertiliser inputs of any dryland crop because of both its market value and because of its soil nutrient requirements. The location of fertilised crops is a function of the distance from the origin of the bulk inputs--household sweepings and manure--to the field site, which depends on the agro-ecological requirements of the crop. Obviously, if a farmer has a cart to transport household sweepings and manure, the distance factor is less important and the range of possible fertilised field sites greater.

ii. Plant protection practices.

The common occurence of maize in fields close to the house (*soforow*) that I have just linked to the ease of

transporting organic waste to nitrogen-demanding maize has also been attributed to the benefits for guarding the maize against bird and monkey predators (Bagayoko 1977). For all maize grown in Soro in 1987, 55% was protected by, either a fence (35%), or close (<10 m radius) proximity to living quarters (20%). 45% was grown in unfenced fields over 100 metres from any houses. In contrast, millet and sorghum were rarely fenced (1%) and fonio never was.

Those figures could hardly indicate that farmers were unwilling to plant maize in an unprotected, open field. In the fields of the hamlets, however, all seven households planted maize unfenced next to the house, and additionally sometimes inside fenced personal field plots. Only two of those hamlet households had additional maize fields in rectangular parcels not immediately adjacent to the house. Of the fifteen households in central Soro, only three, each among the smallest, had a small plot of maize adjacent to the house. The others grew it inside fences or out in fields at some distance from the house. Space limitations prevented them from growing it next to their houses.

All of the maize outfields were planted after the cattle in the area had begun to be closely supervised by herders corralling and daily taking the herds away from fields in the bush. Of these five outfield maize growers, three were among the top maize planters in terms of area (1 ha and over). They hoped to be able to sell some of their crop. Most maize growers, 70% or 16 of 23, had less than half a hectare of maize. It appears, therefore, that

farmers preferred to grow maize next to their house, space permitting. Here, the high nitrogen-demanding crop would benefit from kitchen waste disposal. For a farmer to grow a hectare or more of unfenced maize represented an attempt to market the grain.

Farmers were most concerned with protecting their millet and sorghum from birds just after sowing. Birds, especially partridge (Francolinus bicalcaratus), pecked seeds out of the holes made by the seeding stick, forcing some farmers to re-sow up to four times. Children were sent to guard the fields by chasing birds and making noise. We found five (7%) millet and sorghum growers experimenting with chemical protection. They mixed the crushed contents of old batteries (*pili mugu*) in their seed containers to coat the seeds. As far as we could tell, it was the first year of the practice. Some farmers claimed that it worked; others were sceptical. I did not observe any obvious difference between the areas where treated and untreated seeds had been planted, but the practice was evidence of the kind of continuous adaptive trials undertaken by farmers.

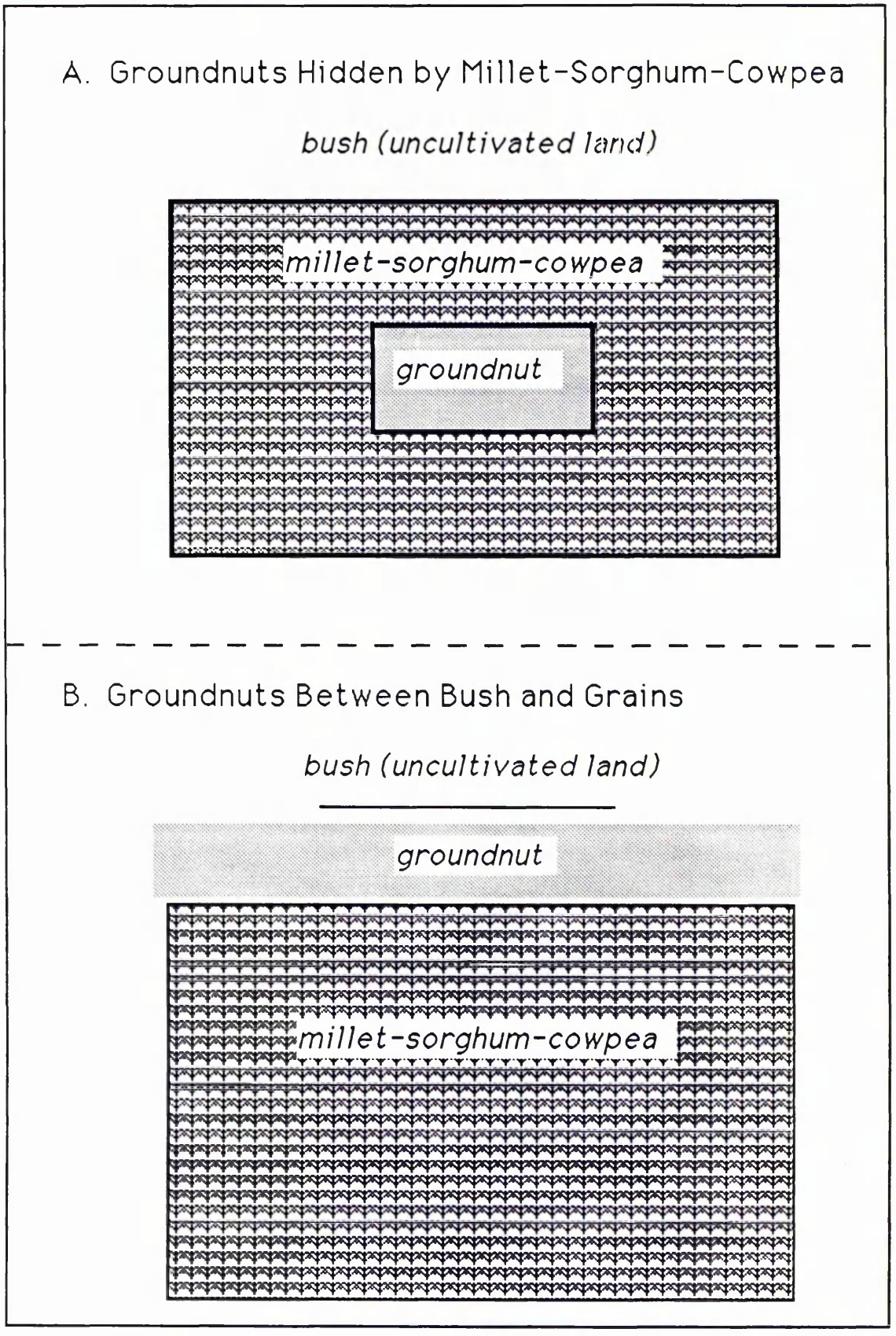
Farmers IV,5 and X,1 practiced a labour-intensive, but more sure protective technique. In the morning they sowed and in the afternoon they lightly disturbed the top 1.5-2.5 cm of the soil surface with a hoe blade. The head of IV,5 explained that by distrurbing the soil surface, the birds could not see where the seeds had been planted. She said that the practice took a lot of time, but that for the second or third sowing, it was especially necessary that the

seeds germinated so that they would have the benefits of the full rainy season.

Groundnuts were sometimes protected by the location of the plot in relation to the bush (Figure 7.8.A). Specifically, they were planted where they were surrounded by grain fields. However, it was not unusual for a groundnut field to be exposed to a border of bush. Other groundnut plots were within fenced fields. Farmers explained the need to protect groundnuts from monkeys. As a result the groundnut fields were hidden by millet and sorghum. Voandzeia would seem to be just as attractive as groundnuts to a monkey, but they were always bordering bush, except where intercropped with groundnuts in a primarily groundnut field.

Farmers' explanations of ground nut planting in Soro seem to represent two schools of thought with regard to protecting the crop and adjacent grain crops. Each of the divergent practices has been recorded elsewhere in Mali, but in different locations. Lewis (1979:123, 220) was at pains to explain the practice of planting groundnuts at the edge of grain fields so that field surveillance could be facilitated--farmers looking over the low growing groundnuts to the towering grain to guard the field against monkeys (Figure 7.8.B). But Brasseur (1961:647) noted the practice of encircling groundnuts inside an expanse of tall grain. Assuming that Segu monkeys (Lewis) and Buguni monkeys (Brasseur) have the same tastes, the different practices may reflect the value of the crops, at different times, and in different regions.

Fig. 7.8 Alternative Positioning of Groundnut Parcels in Relation to Bush



Voandzeia is a relatively pest-free crop. The three varieties found in Soro are distinguished only by the colour of their seeds. In village interviews, Voandzeia was cited as a locust resistant crop, like other root crops. Elders in Cinzana, Segu Region have noted its importance during a locust plague in 1932 (Soumaoro 1983). Fonio was cited for its drought and locust resistance. After germination, fonio remains quite low to the ground (<25 cm) for about 50 days, thus it has little surface area exposed during dry periods at the beginning and middle of the wet season. Also, if locusts swarm, they tend to pass right over the ground-hugging fonio in favour of the higher millet, sorghum, and maize.

In 1987, Soro farmers were most concerned with bird, mammal, and insect pests. The most threatening pests changed according to the period in the season and the kind of rainfall during a given season. As with fertiliser inputs, plant protection measures requiring a special investment of time and effort are more common with market-oriented crops. Considering all the cropland, though, farmers can do very little to protect crops from losses. They recognise these losses and are interested in experimenting, e.g. with the contents of dry cell batteries as a bird repellent, to reduce them. Fencing, guarding, and positioning of crops were the most apparent measures taken to protect crops.

Like site selection, fallowing, rotations, and intercropping, the fertilising and plant protection measures discussed in this section vary depending on the crop. The rea-

sons for the variation are connected to both the farmers' understanding of the requirements for securing an abundant harvest, their possession of the means to enhance production, and their objectives in growing the crop. These factors are also important in determining the tilling technique employed.

5. Tilling Practices.

Farmers tilled the soil using three practices: hoeing--either a flat surface or in mounds or ridges, oxen ploughing, and tractor ploughing (Photos 7.4-7.6). Of the agronomic practices discussed in this chapter, the differences between these methods and the reasons for certain farmers to use them is most striking. A strong agro-ecological rationale is complemented by an undeniable social rationale. Field types, agro-ecology, and crop destination are all implicated in the operation of the farming system when tilling practices are evaluated.

Except for fonio, which requires only a minimum of soil tilling,[13] the soil in which dryland grains and pulses are planted is worked up to a depth of 30 cm under current practices. This tilling of the soil can be done by digging into the surface, as with a plough blade (*buluku, ntura kè, labourer* (Fr.)), in conjunction with the building up of a ridge. On the other hand, the soil surface can be scraped with a wide hoe to build up a mound, thereby minimising the

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13. See the Appendix D on crops for more on fonio (*fini*) cultivation.

Photo 7.4
Mounding

Photo 7.5
Oxen-Ploughing

Photo 7.6
Tractor-Ploughing

digging into the soil by concentrating all surface soil on the field's horizontal plane into a vertical heap (*ntugun wuli*).[14]

In this section, I will describe the seasonal programme for mounders and then for oxen ploughers and tractor ploughers to highlight some qualitative differences in the cultivation techniques for the same crops. I will do this by first describing the pattern of two households, which I will present as models. At the end of this section, I will discuss the consequences of the different tilling techniques.

i. Mounding.

Seeding (*danni kè*). I will outline the work programme followed by Household IX as a model for mounding. Households IV, V, VII, VIII, and XVI had similar work programmes.

Household IX began sowing millet (var. *baro*) and cowpea on 9 June. Fourteen men aged 15-50 years, seven women 20-45 years, and six boys 9-14 in the household field using seeding sticks (*bolènw*) and cups, walked around the eroded mounds left from the 1986 season placing 2-5 seeds in each of 2-4 holes opened in the mound surface by inserting the *bolèn* and gently flicking up 3-6 cm of the soil crust. The work continued in a sweep of the millet-cowpea field from the western side to the south, then the sorghum-cowpea sec-

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14. Mounding is also expressed as *ntugun kuru*. *ntugun* means mound (noun). *kuru* means to fold, which describes the action of folding under the grasses and topsoil. *wuli* means to stand up, get up, erect.

tion, and finally the groundnuts before the last millet was planted in a newly cleared parcel. Soil conditions permitting, meaning sufficient moisture, this activity continued daily until 20 June when the first weeding started during a short dry spell. This household finished millet, sorghum, and cowpea seeding on 24 June.

Scraping, weeding, hoeing (*shyèni kè*). On 25 June the first weeding began in the section that had first been sown two weeks before. The Household IX workers made the second pass through the entire field tilling the soil surface. All surface area was disturbed whether or not weeds were growing, and deep strokes were limited to those areas with dense grass growth. Many areas had very little grass or other weeds, especially in comparison with other Soro fields at the time. The head of the fieldwork group, the eldest man, said that the overall light till was to interupt weed growth before it even started.

Mounding (*ntugun wuli*)[15]. On 29 July the third and final pass through the field before harvest began with the rebuilding of mounds. This phase in field care accomplished several things at the same time: weeding, mulching, erosion control, thinning, and transplanting. The entire soil surface was again disturbed, usually by a long stroke of the wide-bladed hoe (*musodaba*) that shaved off surface soil including weeds, decomposing shea leaves, and other leaf lit-

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15. The expression *fila kè* 'second doing' instead of *ntugun wuli* was heard in Soro. Lewis used the term exclusively to describe 'second made mounds' (1979:216).

ter (Photo 7.4). The pared soil was tossed on to the mound supporting what was by that time at least one metre high millet. Nearly six weeks into the rainy season, the sides of most mounds had not been reinforced since the previous year and were eroding. As a consequence, millet and sorghum roots were often exposed.

While the farming team of household women and men rebuilt the mounds, the head worker thinned and transplanted the millet (*nyò turu*), tearing off the tips of the leaves to induce growth and planting it in a newly raised mound between the now reinforced older mounds where sowing had occurred (Photo 7.3). The transplanting field head used a shorter bladed hoe than those engaged in the remounding. On 22 August, Household IX completed its fieldwork for 1987, besides the harvest, with a loud cheer as the last mound was reinforced. With the household grain field work completed (*foro la ban*), the workers concentrated their efforts for the rest of the season on individual field units.

Household IX celebrated the day following the last household field weeding. While most of the workers went to their personal fields for part of the day, they all took time off to relax and eat lamb which the household head set aside for the occasion. This general pattern of work was followed by other farmers with mostly mounded fields.

ii. Ploughing (oxen).

As a model of a ploughing programme, I will outline Household XX's farming practices. Households II, XI, XIII,

XIV, XV, and XXI followed similar programmes.

Household XX ploughed all of its fields with oxen-drawn ploughs in 1987. The 21st of June was the first day of ploughing for this household. The household head had waited until the soil was moist and easier to plough and his cattle had come to their wet season (*samiya*) pasture at Soro after having been away during the dry season. Also, most oxen are not capable of pulling a plough through soil immediately after the hot, dry season with its lack of good fodder and water, especially if the soil is not yet softened by moisture. By waiting several weeks into the rainy season, a ploughing farmer can use rested and strengthened oxen.

The plough (*misidaba*) was operated by two or three persons: one who guided the plough blade, cutting the soil surface to make a straight furrow; a second who led the oxen team by walking in front of them pulling a nose rope; and an optional third who walked alongside the oxen prodding them with a stick or urging them on with a whip and calls. In most households the plougher was a man between the ages of 15 and 60 years and the rope holder a younger boy.[16] In Household XX, girls often took the rope to lead the oxen team. Ploughers were especially careful to minimise compacting soil that had been tilled.

As the millet, sorghum, and maize fields were ploughed, sometimes by two plough teams working simultaneously, several women and/or men would sow with *bolèn* in straight

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16. Lewis noted that the oxen pullers in Dukolumba were uncircumscribed boys (1979:217).

lines along the ridges formed by the overturned soil. Millet and sorghum were sown in separate fields, with cowpea intercropped in some areas. In one maize field, sorghum was intercropped. On 29 June, the household head began to use his oxen drawn sower to speed up the sowing of sorghum (*keninge*) which was not nearly finished even at that late a date. The seeder eliminated the need for a *bolèn*-wielding worker and assured straight rows which could later be weeded by a harrow.

At the end of an eleven day drought, Household XX began weeding on 3 July. This household owned and used a three-pronged harrow (*nyarinyari*)[17] drawn by an oxen team. By dragging the harrow over the soil surface, a farmer could disrupt weed growth. To use this tool, the farmer had to plant in straight rows at a regular distance (approx. 50-60 cm) so that neither oxen hooves nor the blade of the harrow damaged the seedlings. The rake can only go down the rows, though, so that the space along a sown row between seedlings had to be hand-hoed. Seeding continued after weeding started, with maize sown by the seeder up to 17 July, millet until 9 August, and sorghum (var. *wiyanka*) until 13 August.

This household head ploughed and seeded millet and sorghum after rains and concentrated on weeding between rains, always letting the daily soil moisture conditions dictate his activities. All the maize fields were fertilised with nitrogen-phosphorus-potassium (N-P-K) purchased in Baginda.

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17. The three-pronged weeder was also called *ngurunguru*.

They finished a second weeding of all fields in mid-September.

iii. Summary of the two tilling types.

These two examples do not show **all** the characteristics of ploughing and mounding in Soro. I have given details of the acivities of two households to provide outlines of the schedule of agronomic activities during the three months of millet, sorghum, and cowpea growing when the labour input is greatest. Some of the methods described in one type of field, such as transplanting in the mounded field or sowing following a rain after weeding had started in the ploughed field, were observed in both kinds of fields. Ploughers did not always plough a millet-sorghum-cowpea field before seeding it. Indeed, some fields that had been ploughed in 1986 were not ploughed at all in 1987, either because the household had lost its oxen, or the farmer did not want to 'tire' the soil with annual ploughing. The combined observation data from all fields reveals several lines of generalisation that may be compared with findings from a limited number of other studies.

iv. Mounding versus ploughing.

I will organise my discussion of soil tilling practices around two themes: one of agronomic rationale for choosing to hoe or plough, and the other of a social-political reason for enforcing a particular method. These themes relate directly to the two broad emphasises--ecological and social

--of research on production constraints.

On the one hand, the ecological touchstone in social science research in West Africa; or, in other words, the reference to physical environmental factors as causal in determining social history and practice. Examples of such environmentalism are found in Hopkins' (1973) hallmark economic history of West Africa in which he makes reference to forest-savanna-desert ecological zones between which a 'subtle shift of emphasis' (Ibid:54) in production made markets for traded goods, in Polly Hill's (1982) dry grain agrarian system, Goody's (1971) theory on the reason for the foundation of states in the savanna zone, and the various explanations for the pre-colonial absence of the plough in West Africa (e.g. Goody 1971:25-8).

Richard Roberts' (1987:46-50) economic history of the Maraka of Sinsani and the history of Segu has a background theme of traders capitalising on ecological differences in West Africa. The Maraka, argues Roberts, capitalised on 'desert-side' supply and 'forest-side' demand and vice versa. Richards (1985, 1983) has highlighted a number of ecological themes in West Africa, notably for this study, with reference to agricultural innovation in the subtly, but richly varied biogeography of West Africa. Not least of these is farmer agronomic knowledge applied to maintaining steady yields. In this light, a decision to hoe may be seen as an agronomic decision to conserve soil where deep plough tilling would adversely damage the soil structure. Minimum or zero tillage is receiving increasing study today as a

soil management practice of special interest to tropical applications (Lal and Greenland 1979).

On the other hand, strong arguments have been advanced to seek causal factors in the identification of social constraints on agriculture. Some of these no doubt grew out of social scientists trying to refute (or support) the colonial ideology which produced the image of the 'backward peasant farmer'. Recent evidence, however, makes a strong case for the decisions of patriarchs to assure the continuation of their lineage even when their methods may involve passing up opportunities to expand agricultural production. The theme of preserving the patrilineage as the main farming priority emerges in the works of Meillassoux (e.g. 1981).

In his illuminating study of Bamana agriculture, Lewis (1979) takes the theory of patriarch dominance over agriculture a step further in the direction of patrilineal and agronomic farming objectives by proposing a dual, or in his words, 'two-poled', objective of farmers: to produce descendants with a stake in maintaining the lineage heritage, as well as produce crops which form the sustenance for those descendants. With reference to ploughing, he observes that it takes many hands to hoe but only a few to plough. Since the lineage needs the reproduction of those family members who farm, it might well be to the advantage of the Bamana farm manager to enforce the labour intensive hoeing method even when ploughs were available and affordable.

The evidence from Soro alone cannot prove one way or the other that strong patriarchs resist ploughing to keep

the young at home or that mounding preserves soil structure and is therefore better suited to thin tropical soils in the long term. The diversity of tilling methods in Soro results from a combination of the different material circumstances of the farmers, e.g., a farmer with no oxen or plough has no option to plough unless she or he can gain access to them through a relative or has cash to hire a tractor.

The tractor hiring figures can be interpreted as supporting the argument that it is the household heads and not their subordinates who favour the mounding method, the beneficial soil effects of mounding being advanced as a side argument to support mounding but for completely independent reasons. Tractor ploughing is new and thus it is likely that a large number of farmers are curious to experiment with it. The 1986--first year of tractor ploughing in Soro --results were good enough for others to want to try. A look at the kinds of farmers who hired the tractor reveals a tendency toward those without the option to employ a lot of labour (Table 7.3).

Women farming their own fields were especially motivated by the possibility of the tractor helping them to increase their productivity. Since the tractor could deeply till half a hectare in several minutes, eliminating days of back-breaking hoeing and weeding, women could use it to expand their plots and thus to increase their production. They could invest cash earned from fuelwood sales in hiring a tractor. Household heads without oxen, ploughs, or many young workers invested in the tractor or talked about want-

ing to invest in it if they had the money. For young men, the tractor was a labour-saving device, capable of cutting back on the time and energy spent growing dryland grain, essential for daily nourishment but relatively worthless in the marketplace compared with fruits and vegetables.

Table 7.3

Farmers Hiring Tractor, 1986, 1987

	Area Ploughed with Tractor	
	1986 (ha)	1987 (ha)
<u>Household Fields</u>		
II	1	2.5
VI	--	0.3
XII	yes (No data on area)	3.1
XVI	--	0.3
XVII	--	0.7
XIX	--	0.3
XX	yes (No data on area)	--
	Sub-total:	7.2 ha
<u>Women's Fields</u>		
I,3	--	0.3
I,4	--	1.0
II,1	--	0.2
II,2	--	0.9
XII,1	--	0.2
XIV,2	--	1.5
XIX,1	--	0.3
	Sub-total:	4.4 ha
<u>Men's Personal Fields</u>		
II,A	--	0.7
XIV,A	--	0.5
XIV,B	--	0.5
XIV,D	--	1.5
XIV,E	--	1.1
XIV,F	--	0.2
	Sub-total:	4.5 ha

Concern for soil care came from farmers at all stations in the household structure, but it was often best articu-

lated from the household heads. Heads of large households in particular could afford to concern themselves with the soil since they had adequate labour resources to produce a good harvest; but, household heads are also older, having more experience with farming and a broader interest in the maintenance of a whole and large household. The fact that some older women expressed concern about the effects of deep ploughing on soil fertility suggests that real soil factors do influence the land and labour use and farming decisions of Soro farmers. That some older heads of households were staunch promoters of ploughing, as long as the potentially harmful effects of the plough blade were carefully monitored, timely rotations and fallows kept, and adequate manuring and fertilising with kitchen sweepings and/or chemical fertiliser used, reiterates the existence of a broad recognition of and concern for edaphic factors in the dryland cropping method.

When and where these factors are causal in determining the method of tilling can be discerned by comparing the two methods and consideration of the degree to which a farmer has the means to control a secure annual grain production. At one end of the spectrum is the convinced mounder with a large compound workforce engaged in grain production to meet the annual subsistence needs of the household. At the other end of the spectrum are ploughing farmers, planting beyond the immediate needs of the household with the intention of investing or stocking some of the surplus harvest.

Lewis observed this situation in Dukolomba. In a lower

rainfall region, Toulmin (1985) found that extensive cultivation with a large, ploughing household labour force was linked to a rise in incomes in the late 1950s due to increased groundnut cultivation. Those incomes were invested in ploughs and cattle at a time when households seemed to be disintegrating, so that by 1980-2 only three of the 29 households were without permanent access to ploughs (Toulmin 1985:43, 80). With increasing risk during the low rainfall years of the 70s and 80s, households increased in size and ploughed more land.

In Soro, 16 (72%) households either currently have, or have had in the recent past, a plough, while only 7 (32%) have and use their ploughs with their oxen. Some farmers pointed to disused ploughs at their houses which lacked an oxen plough team because they had to sell the oxen or they had died.

Household X was the most ambivalent with regard to its tilling practices. Roughly half of its household field was mounded and half ploughed, the only such mixed farm in Soro. When asked directly about the practice, the household head was uncomfortable with the question and avoided answering. Over the weeks of observation, we determined that the split field was a compromise. The mounding was the household head's preferred technique for both the agronomic and descendant reasons outlined above, but the young were balking at the mounding work and threatening to leave the household.

The head of Household XIV, the compound with a reduced household field and large personal fields, openly said that

mounding was the technique he preferred and that it was what his lineage predecessors had done in the past on their fields. He argued that the young today, however, would not stay and work together if he insisted on mounding. They would all go to Bamako, he said. He ploughs because he can keep his work force together, and, he added, because fatiguing as ploughing is, it is easier than mounding. The sacrifice to soil care must be compensated for by regular manure, fertiliser, and organic waste applications. In 1987, he was the greatest user of kitchen sweepings in his household field, adding credence to his statement.

The proverb at the beginning of this chapter was stated by a household head in Soro when asked why his household field was mounded while at the same time he owned cattle and had a plough at his disposal. It was his way of conceptualising the twin goals of production: 'the land iguana takes its body from the place where it is reared', meaning that one cannot divorce one's self from one's past and culture. For this *dutigi*, mounding was the tilling practice that worked best. It was what he, like the iguana, had in his blood. He had seen the work of ploughs. Indeed, he had purchased one to prove to others that he was capable of purchasing such a tool.

In the tests of the plough on his farm, the results in terms of yield had not proved that it was vastly superior to the hand-hoeing method. Besides, he believed that ploughing destroyed the soil structure. The test for him was his own success on the continuously cultivated fields around the

house he has occupied for over 50 years (Map 7.1).

6. Harvesting and per Hectare Yields.

Yield alone, as measured in weight of grain harvested per unit area, may not necessarily be the primary aim of farmers as can be interpreted by the concern with maintaining soil fertility over time, keeping household labour on the farm, and lineage continuation. Such a measure of production is, however, a concern of farmers, if not a major goal. The problem for the researcher is measuring the yield. One must have an accurate areal measure of the field on which the crop was grown, and a precise weight of the crop from that particular field. Numerous obstacles make obtaining the two measurements difficult.

The units of measurement depend on the container in which the grain is taken out of the field. In some cases the containers are 100 kg. capacity sacks (*bòròw* or *bòrèw*), and in others, baskets (*segiw*) with a 30-33 kg capacity. Farmers are cautious about revealing the precise yield of their fields. Social sanctions promote discretion in production achievements.[18] The figures may be rounded off. Some farmers put unthreshed grain into their granaries in order to store them to thresh later.

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18. I was not present at harvest time and so was dependent upon the work of Mara to collect data on production by asking farmers. He was known by nearly all as my friend and so could be trusted. Still, as he said somewhat ambiguously, 'the numbers are approximate, but the result is not far from the truth. Perhaps some two or three have told what they did not get. Anyway, the result is not that bad....' (letter of 15 Feb 1988).

Unfortunately it is difficult to make an overall comparison of yields. The data on yields do not prove one way or the other superior results for ploughing or mounding (Table 7.4). Perhaps this is just as well, since a study lasting ten plus years would be the only way to measure the longterm effects on yield of ploughing and mounding. The longterm effects are especially significant given the long cropping cycle of the dryland bush fallow system, not to mention changes over several generations in household composition (Billaz and Diawara 1981:30).

Table 7.4

Average Grain Yields (kg/ha)

	Millet/Sorghum	Maize	Fonio
All Fields	530 (n=51)	600 (n=11)	640 (n=8)
Household	450 (n=21)	N.D.	N.D.
Women's	400 (n=14)	--	--
Men's	750 (n=16)	N.D.	N.D.

Many influences on these yields are hidden by the figure alone. Cowpeas were grown with millet and sorghum. Each farmer produced from less than one basket of cowpeas per hectare (33 kg) to over two and a half sacks (250 kg). Cultural factors may have influenced the reporting of yield figures. Boasting is frowned upon and underestimation of a good harvest, for example, is common. Millet and sorghum do not give the same yields. Sorghum is usually higher in Soro. The high proportion of sorghum in the men's personal

fields may be a major influence on the higher yield figure.

The harvests took place during December. Threshing and storing in the granary was in January. A new form of threshing at Soro was becoming popular. Starting in 1986, a vehicle driving back and forth over grain spread out on the ground has performed the threshing (*nyò gèsi*). This method replaced the traditional threshing with special threshing sticks. Elsewhere (Lewis 1979:244-248) and in the past at Soro, threshing was a festive event, the work carried out by the youth labour groups (*tònw*). In the past, the *tòn* was the only means to perform the work quickly enough to avoid losses to unstored grain. The advent of car threshing means that the work is nearly effortless, fast, and requires few workers. Non-*tòn* threshing is yet another sign of economic individualism in Soro, as well as a demonstration of adaptation.[19]

7. Labour Input.

So far, I have focused on the agroecological and socio-political aspects of dryland cropping with an emphasis on what farmers did, how, and why, or agronomic techniques. In this section, the emphasis shifts to the quantity of labour employed in the tasks. How many workers were weeding? Which crops received the bulk of the labour input and what

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19. Lewis (1979:246) proposed that more economically stratified and fragmented villages had greater absentism from *tòn* threshing activities. Threshing in January, he reasoned, competed with migration for cash-earning activities to which more economically individualistic communities were oriented.

were the most important tasks performed in terms of hours per worker? Answers to these questions should underscore the production orientation of different farming units, as well as provide insight on the broad question of who directs production and land use through control over household and extra-household labour.

i. Input by crop.

The labour input data in Table 7.5[20] show the dominance of the millet-sorghum-cowpea crop complex once again. For household farms alone, an average of 91% of the time working was devoted to these three crops. Some farmers grew the three crops in the same plot, and some separately. The data in Table 7.5 are for the crops combined, as they were in most fields.

Household II with the lowest percentage of time spent on cultivating the three main crops, spent a greater proportion of its time cultivating maize. The cultivated area of the other households (XV, XVI, XX) and personal field XIV,A with high maize labour input figures had relatively high proportions of maize. The relative importance of groundnuts in women's fields is also evident in this table. Replacing

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20. Labour input is measured in terms of the number of workers working per number of hours. Every effort was made to include the actual hours per individual working, not an estimated figure for the entire group of workers of time spent in the field. Only fields where sufficient data had been collected to make a complete picture of labour input were used. These data were collected from 9 June through 14 August 1987. For more on the methodology see Ch. II and Appendix A.

maize as the crop taking up the second position in men's fields, groundnuts were the next most important crop after millet-sorghum-cowpea in terms of labour input in women's fields.

Table 7.5

Labour Input per Crop as Percentage Farm Total: Data for 67 Day Period, 9 June - 14 August 1987

Farm	mil/sor/ cowpea	maize	groundnut	fonio	Voandzeia	Tot.
Household						
I	93	3	--	2	2	100
II	67	**30**	3	--	--	100
III	97	--	--	3	--	100
IV	96	--	3	--	1	100
V	100	--	--	--	--	100
VI	93	<1	1	6	--	100
VII	91	3	--	--	6	100
VIII	90	9	1	--	--	100
IX	93	--	7	--	--	100
X	95	4	1	--	--	100
XI	97	3	--	--	--	100
XII	100	--	--	--	--	100
XIII	86	3	--	11	--	100
XIV	100	--	--	--	--	100
XV	78	**16**	4	2	--	100
XVI	73	**13**	--	7	7	100
XVII	93	1	--	6	--	100
XVIII	100	--	--	--	--	100
XIX	100	--	--	--	--	100
XX	80	**20**	--	--	--	100
XXI	93	7	--	--	--	100
Woman's Field						
I,3	88	--	**11**	--	1	100
II,1	55	--	**41**	--	--	96
II,2	68	--	**31**	--	--	99
IV,1	80	--	**20**	--	--	100
IV,2	100	--	--	--	--	100
IV,3	100	--	--	--	--	100
IV,4	84	--	**16**	--	--	100
IV,5	96	--	4	--	--	100
VI,1	94	--	--	--	6	100
X,1	82	--	**15**	--	--	97
Man's Personal Field						
IV,B	91	1	8	--	--	100
XIV,A	68	**20**	4	8	<1	100
XIV,B	89	--	--	11	--	100

Labour input totals less than 100% include time spent on other crops.

The other crops, Voandzeia and fonio, required only a small percentage of the time devoted to dryland farming. As mentioned earlier, they are grown only at the beginning and

end respectively of rotational cycles. Fonio was not grown on any women's fields, corroborating the statements by men and women that women did not grow it.

The survey period for labour input is slightly biased towards picking up the millet-sorghum-cowpea. Households I and IX as well as the men's personal field heads had already begun or finished sowing maize by the time the survey started on the 9th of June. The first day for any dryland grain sowing was 6 June, when these farmers began sowing maize. The first day of millet, sorghum, and cowpea sowing was indeed 9 June, the first day of the survey. The survey ended after we had ascertained that all farmers had sowed their last millet, sorghum, and cowpea for the season. By this time, of course, many had nearly finished their weeding for the season, and had planted the other crops. Weeding of Voandzeia, not planted until late July or early August, had not taken place by the time the survey ended.

ii. Input by task.

The labour input data revealed the preponderance of time spent on weeding. Table 7.6 shows that only five (24%) of the households spent less than 50% of their work time weeding. When all farms for which labour input data are available are considered, that figure is only 15%. These data show other differentiating labour input characteristics which reflect different farming strategies and different access to tools and labour.

Table 7.6

Labour Input per Activity as Percentage Farm Total

Farm	Sowing	Weeding	Oxen-Ploughing	Clearing	Mounding & Re-Mound.	Misc.
Household						
I	31	66	2	1	--	--
II	35	**37**	27	1	--	<1
III	26	58	--	13	3	--
IV	22	64	--	--	13	1
V	25	57	--	6	12	--
VI	31	**47**	--	7	15	<1
VII	23	59	4	<1	14	--
VIII	24	57	1	1	17	--
IX	17	**38**	--	2	**43**	--
X	23	55	5	--	15	2
XI	27	53	17	1	--	2
XII	41	57	--	--	2	1
XIII	43	**34**	21	2	--	--
XIV	24	81	11	4	--	--
XV	28	58	11	<1	--	<1
XVI	26	69	--	5	--	--
XVII	39	61	--	--	--	<1
XVIII	6	57	--	--	37	--
XIX	20	73	--	1	1	<5
XX	28	**21**	**49**	--	--	1
XXI	13	82	5	--	--	--
Woman's Field						
I,3	16	81	--	3	--	<1
II,1	15	77	3	--	5	--
II,2	22	75	--	2	--	<1
IV,1	21	79	--	--	--	--
IV,2	20	80	--	--	--	--
IV,3	12	88	--	--	--	--
IV,4	14	86	--	--	--	--
IV,5	23	76	--	--	--	<1
VI,1	26	74	--	--	--	<1
X,1	20	76	--	1	--	3
Man's Personal Field						
IV,B	16	84	--	--	--	--
XIV,A	29	63	8	--	--	<1
XIV,B	31	58	13	--	--	--

Miscellaneous activities included tractor ploughing and transplanting. The tractor ploughing never took more than an hour for a single farm, yet it could accomplish what would take many person hours to do by hand.

The five household farms that spent less than half their time weeding fall into two categories: late sowers and early re-mounders. Households II, VI, XIII, and XX were all sowing the main millet, sorghum, and cowpea crops into the second week of August. Each was late for a different reason. All were short of workers. II and VI sustained particularly heavy damage from birds eating sowed seeds and

had to re-sow some areas three times. II and VI also waited to hire a tractor to plough a portion of the household field, thus delaying the planting and raising the proportion of time spent in sowing. XIII had one of the highest ratios of cultivated land to workers, suggesting that they may have been pushing themselves to sow an especially large area. Indeed, XIII's worker-hours per hectare figure is higher than the average, but it is not among the highest (Table 7.7, compare with Table 7.12).

As I noted earlier, XX was the last household to start sowing. Unlike the other households which sowed at least some of their fields in untilled soil, XX ploughed all of the area before sowing, hence the highest proportion of work time spent in ploughing (49%). After the survey ended, this household had to hire non-household labour to catch-up on the weeding. I will discuss the role of non-household labour further in the next section.

The Household IX workers were the only mounding group among the five farms spending less than half their time weeding. This household finished its sowing early and its first weeding (see Section 7.5.i on work cycle), leaving a greater proportion of the time within the survey period to re-mounding. Were the survey to have lasted longer, the other households re-mounding, IV, V, VII, VIII, and X, would likely have had work activity proportions similar to IX.

The proportion of time spent by farms tilling the soil, either ploughing or mounding, varied greatly. 44% of the 34 farms for which I have reliable data spent over 10% of their

work time tilling. The other 66% includes all the women's fields for which I have data and 29% of the household fields. Workers in these fields did not spend much time tilling because either the soil was cultivated flat or it was tilled within a few minutes by a hired tractor.

iii. Input per hectare.

Numerous agro-ecological, social, and site-specific variables can effect the number of hours put into cultivating a crop as reflected in the survey data. These include use of tractor, use of labour after the survey period, specific ecological conditions of plot of land, effort of workers, and effectiveness of work. Household V workers, for example, with the highest figure (Table 7.7), spent a lot of time in their field. They cleared a new portion of their field during the period, as well as sowing, and weeding. In addition, this high figure may be somewhat inflated because some of the hours in the field were spent guarding it from birds, or, in effect, sitting or sleeping. Household XVI workers, similar to those of V (see Appendix D and F: suffering from a split, with old and young but few middle aged members, headed by veterans) also did some clearing, and spent a lot of time resting in the field.

A crucial variable seems, however, to be the technology employed. The first 11 farms in Table 7.7 used no plough, only hoe and sowing stick. The fields with the highest labour input per hectare were those tilled by hand. Among the farms with the lowest worker hours per hectare figures

are those that employed non-household labour after the survey in an effort to try to complete work that had not been done earlier (XIII, XV, XIII, XX, XXI), or hired a tractor to till a portion of their land (II, XII, XVII, II,1, II,2). Only four of the 19 farms (21%) using fewer worker hours per hectare did not use an oxen or tractor driven plough at all.

Table 7.7

Worker Hours per Hectare

Farm	Worker Hours/ha	Tilling Technique
V	536	Hand till/Mounding
XVI	426	"
VI	418	"
X,1	411	"
IV,2	400	"
III	394	"
IV,4	392	"
IV,5	378	"
IV	339	"
VII	335	"
IX	331	"
XIV,B	325	Oxen-ploughing
VI,1	321	Hand till/Mounding
I,3	321	Tractor-ploughing
IV,3	319	Hand till/Mounding
XXI	315	Oxen-ploughing
I	315	" (1986)
XIII	307	"
XI	298	"
XIX	298	" (1986)
XIV,A	292	"
XVII	289	Oxen-(1986) & Tractor-ploughing
XIV	286	Oxen-ploughing
II	263	Oxen- & Tractor-ploughing
IV,1	255	Hand till/mounding
IV,B	254	"
XV	244	Oxen-ploughing
VIII	239	Hand till/Mounding
X	213	Oxen-ploughing & Hand till
II,2	211	Tractor-ploughing & Hand till
XVIII	208	Hand till/Ridging
XII	182	Tractor ploughing
II,1	179	Tractor-ploughing & Hand till
XX	129	Oxen-ploughing

From these data on workers per unit area, there is a strong implication that cultivating a field using only hand tools takes more worker hours than when an oxen- or tractor-driven plough is used. However, other factors contribute to these figures: the relatively unproductive 'work' of bird-watching included in the two farms with the highest worker/hectare ratios, later starting dates of ploughers, and the different quality of work performed by separate work groups.

iv. Rate of work.

Before leaving this section on labour input to crops, some mention should be made of the rate of work. While I did not undertake a Ford-like study of worker productivity, I have been able to calculate the rate of weeding from the labour input data.

On 9 June, the first day of widespread planting activity for the 1987 wet season, Households I and XVII planted the first fonio. Household I employed ten men between the ages of 50 and 14 from 8.00 in the morning until 13.00 to plant using hand tools: hoe (*falo*) and pick (*soli*). The next day nine of these household members returned to complete the sowing during the same hours. They planted *ba* and *den* varieties in a 0.78 ha house field that still showed evidence of the eroded, oxen-ploughed ridges that had supported millet in 1986.

About 50 metres away, Household XVII's three field workers, two women and their husband ages 28-40, sowed in a similar manner. They worked from 7.00 until 10.00 in the

morning each day, but only two of them worked the second day. The three of them also seeded 8.00 till noon on 13 June to finish the 0.30 ha. plot. They too planted on the worn ridges of the previous year's (1986) millet field.

In each of these two examples, the farmers worked at the rate of approximately 10m²/person/hour. Weeding took only a half day of labour in most fields. Since fonio is broadcast over a flat surface rather than planted in rows or mounds, it comes up as a dense, uniform crop that successfully competes with weeds. So, weeding fonio tends to be easier than weeding millet. The best data I have on the rate of weeding millet comes from Household XX. There, hired women workers weeded at the rate of 13-15 m². The speed with which they worked, faster than the rate for fonio, was no doubt due to the unusual cash payment per unit area offered by the head of household. In the next section, I will discuss further the different kinds of hiring arrangements.

8. Extra-Household and Non-Lineage Labour.

Until now, I have concentrated on the household labour that comes from persons who are blood relatives or in-laws. These are not the only kinds of workers on household fields or personal fields. Indeed, demographic changes among relatives can lead to periods when there are few workers compared to the number of mouths to feed. The Chayanov cycle theory of young expanding families becoming, with the passage of time, declining, dividing complex families (Chayanov

1966: 248-9) has been useful in showing that the extended family group may fall into a period of imbalance. During these times, farmers at Soro had several options, including adopting a non-kin worker into the family, paying for seasonal or temporary labour, borrowing labour, or hiring a labour collective (*tòn*). The use of tools is so closely related to labour that borrowing ploughs and sowers must be mentioned here, as well as the hiring of a tractor to plough.

i. Non-kin and hired labour.

As I showed in Chapter V, Soro households had a variety of non-lineage members. Non-kin labour working in both household and personal fields entered different kinds of work relationships with their employers (*jatigiw*). Two kinds can be distinguished by the length of the labour arrangement. The first included seasonal or semi-permanent residence with the household by non-kin workers. Three households had non-kin *baaradenw* 'workers' who lived with their respective households and were not paid cash, and one had a seasonal worker paid in cash (Table 7.8).

These workers as a group had several common characteristics. They were all unmarried men. They came from distant parts of the country, and, except for one, from ethnic backgrounds different from those of their hosts in Soro. The terms of employment and compensation were not at all uniform. They seem to reflect, at least in part, the age and experience of the worker. The younger employees were

less successful at negotiating the more favourable labour arrangements.

Table 7.8

Non-Lineage Agricultural Workers

Host	Ethnic Background	Home Region	Age	Time in Soro	Host/Client Relationship
II	Bozo (Tarawele)	Mòti	19	3/87-5/88 (planned)	Work 4 days for host, who provides shelter and food; the other 3 days for self to hire out to any farmer willing to pay cash.[21]
XIV,A	Dogon (Sanago)	Sikaso	17	6/87-9/87	Hired for season to work every day for a single payment of 7500FCFA paid after 3 mos. Host provides shelter and food.
XIV,B	Dogon (Gingo)	Mòti	36	1981-	Work 3 days for host who provides shelter and food; the other 4 days for self. Has had small garden plot for two seasons.
XIX	Bamana (Samake)	Kulukòrò	28	1983-	Work for host who provides shelter and food.

Those hiring these medium and long-term employees were short on lineage labour, and/or organised to produce for the market. Household XIX had lost two sons who had migrated to Segu. The remaining son and his mother alone could not have produced a harvest sufficient to feed the rest of the

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21. In principle, this worker could hire himself out to any farmer during his three free days. I only saw him working for field heads within his own household, and he said that in fact he had not worked for any other farmers. On his free days, he worked for cash in the II's household field, in the fields of the two 'retired' women of II, and in the men's personal fields of II.

household. Household I was not so short of workers, but had a particular interest in producing beyond its subsistence requirements. The two workers in Household XIV worked only in personal fields. They were not hired for the household field, which, as I have shown, was of a reduced scale not capable of producing a harvest that could feed all household members. Rather, they entered arrangements to work in personal fields where their employees were seeking greater production than the lineage labour could supply alone.

Households XIII, XIV, and XV benefited from a special labour source: Qur'anic students. The heads of Households XIV and XV were Qur'anic teachers (*mori karamògòw*), and the head of XIII was the village imam (*almami*). The three students of the head of XV regularly worked in the household field with the family members. In addition, they helped XIII plant fonio. The five students of the head of XIV worked alongside the family members in both the household and personal fields.

These boys aged 10-15 came from Wèlèsèbugu, from where the family of Households XIII, XIV, and XV originated in the 1940s, and Bamako. They lived with their teachers, and in return for their labour received daily lessons during the dry season. These students also comprised, along with the *baaradenw*, the surplus non-lineage labour available for hiring. When they were not required to work for their hosts, they could work for farmers willing to pay for their labour. These students made possible the surplus production of Households XIV and XV. While the value of the Arabic in-

struction they received was privately questioned by other village residents, their contribution to production was undeniable. Below, I discuss the rates for which they worked.

Table 7.9

Village Agricultural Labour Wage Rates

Date	Employer	Employee	Description	Rate per person
June	XIV,D	students	gardening	100FCFA/1-2 hrs
June	XIV,E	students	gardening	250FCFA/2 hrs (125FCFA/hr)
Jun-Aug	II,A	Bozo worker	planting, weeding	500FCFA/7 hrs (71FCFA/hr)
Jun-Sep	XIV,A	Sikaso worker	sowing, weeding	7500FCFA/3 mos. (approx. 15FCFA/hr)
Jun-Jul	many	merchant of Kasela, Eaux et Forêts	ploughing with tractor	15,000FCFA/ha
5 July	XIV,D	students	clearing stubble in garden	350FCFA/550m^2 (6364FCFA/ha)
22-23 Aug	XX	Munzun day labourers	weeding	500FCFA/400m^2 (12,500FCFA/ha)

The second kind of work arrangement was short-term. This included day labour recruited from within the village or from outside paid in cash. Short-term hiring within the village was exclusively with the non-lineage *baaradenw* on their off days. Cash relations between village households is frowned upon and has not developed in labour hiring. The exclusion of hiring household labour does not include workers from other villages. The head of Household XX, for ex-

ample, hired ten women from Munzun to weed his household field. Although they all came together and worked at the same time, he payed each of them individually by the area of land they weeded. Each was paid a flat rate of 500FCFA for each 20 m^2 weeded. This was among the highest wages paid in the village and the most precisely monitored work (Table 7.9).

Household XX was very late in sowing and was crippled from a household labour shortage. With the most considerable material assets in the village, including cattle, a second house in Baginda, two ploughs, a harrow, and a sower, the head of household could afford to hire labour.

ii. Terms of hiring and borrowing.

Wage rates varied considerably in the village. Since wage labour within the village does not have a long tradition, this is not surprising. The difference between the seasonal salary for the 17 year old from Sikaso and the wages of the day labourers from Munzun is phenomenal. One 30 year old woman earned 2000FCFA in one day of weeding at Household XX. The young man from Sikaso earned only 7500F CFA after three months of daily sowing, ploughing, and weeding.

Before discussing further the hiring of non-household, non-lineage labour, this time the labour group (*tònci*), I should underscore the importance of the non-monetary borrowing of tools and their operators. These loans, especially of oxen teams for 1-4 days, was not uncommon (Table 7.10).

Table 7.10

Labour/Plough Exchanges

Lender	Recipient	Terms	Dates
XV	VI	<0.3 *soforo* ploughed for 2 days weeding by 18 yr old man	Ploughing 11 Aug., weeding 18-19 Aug.
XX	XV	Harrow lent for a day. No compensation requested.	15 July
II	I	1.0 ha ploughed for unspecified weeding.	7-9 Aug.
XIII	III	0.7 ha ploughed for 6 days weeding by 12 year old boy.	31 July-6 Aug.
Friend in other village (Nkòniko)	VII	0.5 ha ploughed for unspecified compensation.	28-29 July
X	XXI	Ploughing for unspecified compensation.	
XX	Friend in other village (Bila)	Ploughing for no compensation.	
I	XXII	Weeding. No compensation requested.	

Exchanges occurred between persons with close personal or kinship ties. This pattern has been observed elsewhere in Mali (Toulmin 1985:80). Farmers without ploughs could negotiate a loan, usually with oxen and ploughers, in exchange for weeding labour over a period determined by the amount of ploughing. The borrowing farms included the late arrivals (XXI, XXII) with incomplete capital resources, small households without ploughteams (III, VI), and large

households seeking to expand production (I, XIV, VII).

iii. Youth farm labour group (*tònci*).

The 32 member young men's farm labour group (*tònci* or *cibò*) constituted another form of non-kin and hired labour which worked on both household and personal fields during the 1987 season. In 1987, the Soro *tònci* had 14 jobs lasting either a half day or a full day (Table 7.11). Two farmers hired the group on two occasions. The Soro *tònci* was not available for work in the early part of the rainy season because the labour of the individual *tònci* members was required by their respective heads of household. They were not released from their own household field responsibilities to work as a corporate group until the first weeding had been completed. The *tònci* was thus not employed for any sowing. Its principal task was weeding. In other villages, *tònw* work in harvesting and other work including non-agricultural projects (Teme 1985).

Of the twelve employers of the *tònci* in 1987, five were Soro household heads. 23% of the household fields benefited from work group labour. The other employers were heads of personal fields. These employers were men who were members of Households II, IV, and XIV. None of the women field heads hired the *tònci*.

Six of the fourteen jobs, or 43%, were for Soro household farms. They included households that sowed late, suffered from bird attacks, and had high land to labour ratios (Table 7.7). For one reason or another, they were con-

Table 7.11

Soro Farm Labour Group (*tònci* or *cibò*) Employment.

Employer	Field Type Worked	Period Worked[22]	Income
1. XIV,E	personal	15.30 - 18.00	3500 x 2 = 7000FCFA
2. XIII	household	" "	3500 x 2 = 7000
3. I	household	8.00 - 14.30	8000
4. XV	household	15.30 - 18.00	3500
5. XX	household	8.00 - 14.30	10,000
6. IV,C	personal	15.30 - 18.00	3500
7. XXI	household	" "	4000
8. Sonraï from another village	household	8.00 - 14.30	10,000
9. II,A	personal	15.30 - 18.00	3500
10. XIV,D	personal	" "	3500
11. XIV,F	personal	" "	3500
12. II,C	personal	" "	3500
		Total:	67,000FCFA

strained by lack of household labour and had to hire the *tònci* to make up for the shortage. Households I, XV, XX, and XXI all hired the *tònci*. They all had fewer than 1.0 worker per hectare in the household field during the study period (Table 7.12). Only three other households had such a low worker/hectare ratio: one was the largest tractor user, and the other two had efficient household labour groups.

The difference between the Table 7.12 and Table 7.7 is that in 7.12 I have used the data of how many men and women worked per day, but not considered how long they worked. A household in which all the workers consistently worked long hours would thus have a lower figure. For example, in Households VIII and XXI all of the household field workers

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22. The period recorded here as 8.00-14.30 is a full day job. The 15.30-18.00 period is for the afternoon rate (*wula fè*).

worked long hours in the household field nearly every day. This table shows the workers available who worked. Fig. 7.12 takes into consideration the number of hours worked by each individual worker. It hides the labour shortage of Households VIII and XXI where the workers wore themselves out on the household field and had little time or energy left for other productive labour.

Table 7.12

Workers per Hectare (Household Fields Only)

Household	Workers/hectare	Notes
XX	0.5	Hired *tònci* and day labour
VIII	0.7	3 adults working long hours
XV	0.7	Hired *tònci*
X	0.8	
XXI	0.9	Hired *tònci*
I	0.9	Hired *tònci*, gift of labour
II	0.9	Hired tractor
XII	1.1	
III	1.2	
IX	1.2	
XI	1.2	
XIII	1.3	
XVI	1.3	
IV	1.4	
VII	1.4	
XIX	1.4	
VI	1.5	
XVII	1.5	
V	1.7	
XVIII	2.6	Only 1 ha field
XIV	4.5	Big personal fields

In Table 7.13, I have shown the income of the *tònci*, with the per worker rates. The *tòn* is a group that is indivisible in terms of income, but it is useful for the purposes of comparison to figure the per worker income generated by each group member (*tònden*).

Table 7.13

Wages of *tònci*.

Job	Rate (FCFA)	Rate Per Hour	Approximate *tòn* Income Per Worker Per Hour	Members
8-14.30, non-member	10,000	1538	48	32
8-14.30, member	8000	1231	38	
15.30-18.00, non-member	4000	1600	50	
15.30-18.00, member	3500	1400	44	

Extra-household and non-lineage labour, as well as hired and borrowed tools are used by a wide variety of farmers and under various circumstances. Were striking patterns of inequality present in the village, they would likely appear here: the wealthy and powerful exploiting the poor and weak. Such a differentiation is not easily made. Temporary or seasonal rural hired labour is a part of the process of changing agricultural labour organisation, but it is not a one-way 'proletarianisation' (Swindell 1985:91-100). Shared time and land arrangements, as well as the option to return to one's 'home' region to work within a kinship structure give a worker options that limit his or her commitment to the labour market.

The 'outsiders', non-lineage workers attached to households, were hired by farmers with temporary labour bottlenecks caused by emigration of lineage members or changes brought about by the Chayanov cycle. The workers' need to

assure their own regular food supply and shelter is exploited. Heads of households can offer them food and shelter in return for work. When non-lineage workers (from outside the village) are looking for cash, they are not likely to find good financial terms in a village where cash income is not regular or sufficient to keep the children of resident landholders in the village. The life histories of the workers in Soro show that they ended up there only as an alternative to what they thought they might find in Bamako or elsewhere in Mali.

Despite the monetisation of the labour group's (*tòn*) compensation, the group's continuation and transformation reflects the non-linear way that labour and production commoditisation have affected the moral economy. As I have shown, forms of labour exchange ('borrowing' a worker and a plough), wage labour, and age-set labour exist in Soro. Farms with low workers/hectare were especially likely to employ the *tòn*. One could argue that these hiring households had over-extended their cultivated areas and therefore had a planned labour deficit, but a single season's activities are insufficient to prove this. Whether tractor hiring and labour hiring are leading to greater differentiation, the evidence from Soro is not yet clear. Farmers themselves interpret the persistence of non-monetary plough and labour exchanges as evidence of their own commitment to communal values and a moral economy in which differences are levelled.

The revival of the young men's *tòn*, supported by the

chief (*dugutigi*) and other senior men and women, also signals the development of a form of labour organisation adapted to present farming practices. The *tòn* derives from an historical Bamana initiation association, the values of which support the patriarch-dominated structure. It also embodies the solidarity of the young, who perhaps today more than in the past have the option to remain in the village to earn their own cash by growing crops. It is thus in the interests of the heads of households to support an institution that helps maintain large household farming at the same time that it makes living in the village more attractive to the descendants of the lineage. In the next chapter, I will examine the market gardening system which is so attractive to these young men.

Conclusion.

In the first five sections of this chapter, I outlined the agro-ecological and socio-political qualities of Bamana farming. I showed that in different types of fields, one is more likely to find crops that reflect the objectives of the head farmer. The way those crops are grown, in turn, suggests some of the constraints faced by the farmer as well as his or her skills in utilising the resources at hand.

The dominance of intercropped, non-fertilised millet-sorghum-cowpea on household fields thus reflects the subsistence orientation of the household heads. Where crops, or part of the harvest, are intended for market, cash-paid inputs are more likely, as in the case of chemical fertiliser

on maize or tractor-ploughing for groundnut growers. The different practices that characterise the cultivation of minor crops exemplify the importance of farmers' skill in manipulating the savanna ecology and crop requirements for maximum benefit. Efforts to improve soil fertility on maize plots with various fertiliser inputs is related to the specific high nutrient demand of maize. Fonio, on the other hand, is grown where soil has lost fertility toward the end of the growing cycle in the crop rotation.

Decisions concerning farming techniques, notably ploughing or mounding, are related to household politics--strength of the household head, solidarity of household field workers--as well as agronomy. Soil fertility is so important to a field head that its maintenance is inextricably bound to social and political factors, as well as economic factors, i.e. the ability to purchase, or to gain access through a relative to, a plough or oxen. The mounding versus ploughing debate is not one of 'backward' peasants rejecting 'modernity', but of agro-ecological and household labour organisation trade-offs.

In the last two sections, I emphasised labour constraints and the labour bargaining power of different farmers. Within and between the labour groups working different types of fields are farmers with unequal access to labour. The household field and various types of men's and women's personal fields may be seen as complementary, notably in the ideology of the household head who's own field is the first priority. Conflicts in farming are inherent, however, in

this system where all farmers can not have equal access to labour for their own fields. Household production supports the *dutigi*-centred structure, and an unbalanced expansion of personal field production threatens it.

That said, there are ways in which a development of personal fields can support a *dutigi*-centred system, while at the same time providing more autonomy to personal field producers. Individual field units paradoxically support the household integrity by allowing sub-units to produce outside the direct authority of the household head. The product of the household field may remain central to household unity without being the most important production organisation, as in the arrangement of Household XIV. Where household unity is threatened by rivallry, an expansion of the production autonomy of household sub-groups may act like a valve releasing the pressure on the group to farm together. The development in Soro of market gardening in conjunction with household dryland farming is such an adaptation which will be explored further in the next chapter.

Chapter VIII.

Market Gardening.

> The young just work in their gardens! In the past they worked groundnuts and millet in the household and personal fields. Mango, mango, mango! Tomato, tomato, tomato! When millet isn't produced, the old men grow weary. *to* can't be made. If millet isn't produced, you can't eat. In the past, the household field was larger.[1]
>
> --Soro *dugutigi*

In the last chapter, I showed that dryland grain farming in Soro was predominantly household subsistence oriented. Just four grains and two ground nut crops were grown in the dryland sector of the farming system. In contrast to the extensive farming of these six crops, farmers also grew a wide variety of fruits and vegetables in intensively cultivated small plots. This garden production was of two kinds: 1) a household kitchen vegetable garden, and 2) a market garden. This chapter will focus on the latter to show the interrelationship between this form of commodity production and the household subsistence production discussed in the last chapter.

As with the organisation of farming on dryland grain and pulse fields, market gardening revolves around certain persons who can be identified in terms of their social rela-

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1. *denmisenw bè nakòw sènè. folofolo u bè tiga ni nyò sènè forobaforo ani jònforo. mangoro, mangoro, mangoro, tamati, tamati, tamati! ni nyò m'a sòrò, cèkòròbaw bè sègènnen. to ma sòrò. ni nyò tè sòrò i tè se ka dun. folofolo forobaforo ka bon.*

tions with others. Older male household heads are central to dryland farming. Market gardening is favoured more by younger men, as can be discerned from the quotation at the beginning of this chapter. Market gardening is thus the third arena in the spatial division of labour that I outlined earlier: women harvesting fuelwood for consumption and sale in the bush, household heads controlling subsistence dryland grain production, and young men interested in market garden commodity production.

The organisation of Bamana farming into two spatially and socially distinguishable farming types raises questions of the contradictory objectives of peasant farming characterised, on the one hand by subsistence, dryland, grain, extended family household fields, and on the other by market, dry season, irrigated, fruit and vegetable, personal plots. As seen in the last chapter, the former characterises a unified household structure centred on the household head (*dutigi*). The first priority of such a farm would be the reproduction of that structure. This, as I showed in the last chapter, could mean the organising of the maximum number of lineage members to work a common field to assure the subsistence needs of the individual members of the group. The reproduction of such a structure, the orientation of the patriarch to the continuation of the lineage, might not necessarily coincide with maximising crop production.

The interrelationship of dryland farming and market gardening will be developed further in this chapter. In the first section, I will discuss the definition of a garden

(*nakò*), and in the second section I will elaborate on the distinction between the *nakò* farmed by women for household condiments and the market gardens that have developed around urban District of Bamako. The third section will focus on the intensified farming techniques that characterise market gardening in Soro: experimentation, diversity of crops, protection from pests, fertilising, and manuring; I will show that the methods and objectives of land use both support the distinction between household and market gardens and warrant analysis in terms of the overall domestic economy in which dryland grain and pulse growing in household fields (*forobaforow*) plays, or at least has played, a central role.

The fourth section will demonstrate the market orientation of the gardens, including their proximity to markets, transportation to markets, crop prices, productivity, and income generation. The fifth section presents the organisation of farming time as an intensification of production. Finally, I conclude the chapter by analysing the internal household and village conflicts within the peasantry developing in the shadow of the increased commodity production as represented in the growth of market gardening, and the ultimate subordination of the peasantry to state and market forces.

1. Defining the *nakò* 'garden'.

i. Crop type.

The relationship between Bamana agriculture and Bamana

cuisine on the one hand, and on the other hand, ecological milieu, is strikingly revealed in the word that translates most closely to garden: *nakò*. It is composed of the word for sauce (*na*) plus stream or streambed (*kò*)(Bagayogo 1982: 52). Some of the main Bamana meals consist of a carbohydrate-rich base made from one of the commonly grown grains: millet, sorghum, maize, fonio, or rice.[2] To that base, a porridge in the case of *to*, a sauce made from a potentially wide variety of vegetables, flavourings, and meats is added. These sauce (*na*) ingredients change seasonally according to their availability.[3] There is, therefore, a strong association between the cultivation of vegetable crops, 'gardening', and sauce.

The total land area devoted to the growing of fruit and vegetables reveals the importance of tomatoes (Table 8.1). Among annual plants, tomatoes occupy the greatest area, followed by chili peppers, and cucumbers. For fruit tree crops, I have not attempted to estimate the area because the mature trees were not planted in uniform rows. The area devoted to mango growing is expanding as farmers plant new orchards in rows. In 1987, three farmers planted over a

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2. Common dishes include *to*--the most common dish in Soro for any meal, served in the field during *samiya* for *tilelafana* 'lunch', also for *daraka* 'breakfast' and *surofana* 'dinner'--*basi*, and *kini*. Dishes served with milk rather than a vegetable sauce include *seri* and *mòni*.

3. Often sauces for special occasions stand out by the presence of meat, e.g. beef, mutton, goat, chicken, *kamin* 'Guinea fowl', *wòlò* 'partridge', *minan* 'antelope', *bala* 'porcupine'. Lewis (1979) notes the social importance of preparing a reputable sauce.

hundred slips of mangoes. The land on which they were planted will continue, however, to support annual tomato, groundnut, or grain crops until in 7-10 years the shade of mature trees limits the growing space for ground crops. In the past, mangoes have been produced on only a few trees scattered around the village and the streambeds. In Table 8.1, I have included only those trees grown in gardens, not around houses.

Table 8.1

Fruit and Vegetable Crop Area

Crop	Area (ha)	% Garden Area	% Total Cultivated Land
Tomato	5.26	49	2
Chili pepper	1.72	16	1
Watermelon	0.95	9	<0.5
Cassava	0.34	3	<0.5
Cucumber	0.32	3	<0.5
Okra	0.28	3	<0.5
Bamana aubergine (*nkòyò*)	0.17	2	<0.5
Other[4]	1.59	15	1
Total	10.63	100	b

[includes 0.5 ha women's household gardens]

Number of Fruit Trees in Gardens

	(No. Trees (% All Garden Fruit Trees)
Mango	408 (68%)
Papaya	71 (12%)
sunsun (Diospyros mespiliformis)	50 (8%)
Guava	39 (6%)
Other (cashew, lemon, baobab)	35 (6%)
Total	603 (100%)

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4. Melon, calabash, sweet potato, string bean, mint, carrot, sesame, *da kumu*, orchard trees; see Appendix D.

Many, but by no means all, sauce ingredients are grown in garden plots. In Soro, okra (*gan*) and Hibiscus sabdariffa (*da kumu*) were two such crops which were grown in grain fields. Hibiscus sabdariffa was often intercropped in millet or groundnut fields, especially around the edge, delineating the field. Other sauce-oriented garden crops like tomato and chili pepper were principally grown for commercial ends. Many other important sauce ingredients are not cultivated plants and originated in the bush rather than a garden, e.g. baobab leaf (*sira bulu*), fruit of *dogora* (Cordyla pinnata), and *sunbala*, made from a fermented part of the pod of *nèrè* (Parkia biglobosa). And, as with the *da kumu*, some crops that could be sauce ingredients like groundnut, were grown in fields. In sum, the garden was by no means the sole production source of sauce ingredients[5], and all the products of a parcel of land called a *nakò* were not destined for consumption in the sauce of a Soro kitchen.

ii. Water and irrigation.

The second component of the word for garden, *-kò*, makes reference to the environmental location of gardens. Farmers seek high watertable areas to plant a garden, so that a well can be dug to provide water during dry periods. The streambed west of central Soro and the high water-table areas of Mamaribugu and Sakobugu were thus dotted with gardens in the

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5. Other ingredients are available only from markets: salt, flavouring cubes (brands Jumbo and Magie), pepper (*fèfè*), and onion *jaba*.

streambeds and on the banks of them (Map 8.1).

During the dry season, gardeners must have access to a well as is shown in Table 8.2. In central Soro, six gardens had one or more active[6] wells in April; in Mamaribugu four had wells, and in Sakobugu 0 had dry season wells, which is why there were no gardens there in April. Thirteen farmers, or 30% of gardening men 50 years or under, wishing to garden but having no access to a well entered land borrowing arrangements with Kòni and Darani land holders and commuted daily to Kanògòla at the downstream end of the Soro *kò* and alongside the Faya.

Table 8.2

Gardens and Water (1987)*

Garden Location	Plots <20m from Streambed	Plots in Lowland[7]	Active Wells	% Gardens With Water Access
Dry Season (*tilema*), March-June				
Soro & Fulabugu	6	0	12	100
Mamaribugu	0	4	5	100
Sakobugu	0	0	0	-
Kanògòla	13	0	9	100
Sirakòrònin	1	0	ND	100
Ntèmènèn	2	0	ND	100
Wet Season (*samiya, fobonda, fonènè*), June-February				
Soro & Fulabugu	90	10	35	25
Mamaribugu	0	33	8	50
Sakobugu	0	6	5	83

* Figures include all spatially and tenureship distinct plots, no matter what size. Some were as small as ten mounds or 4 m^2.

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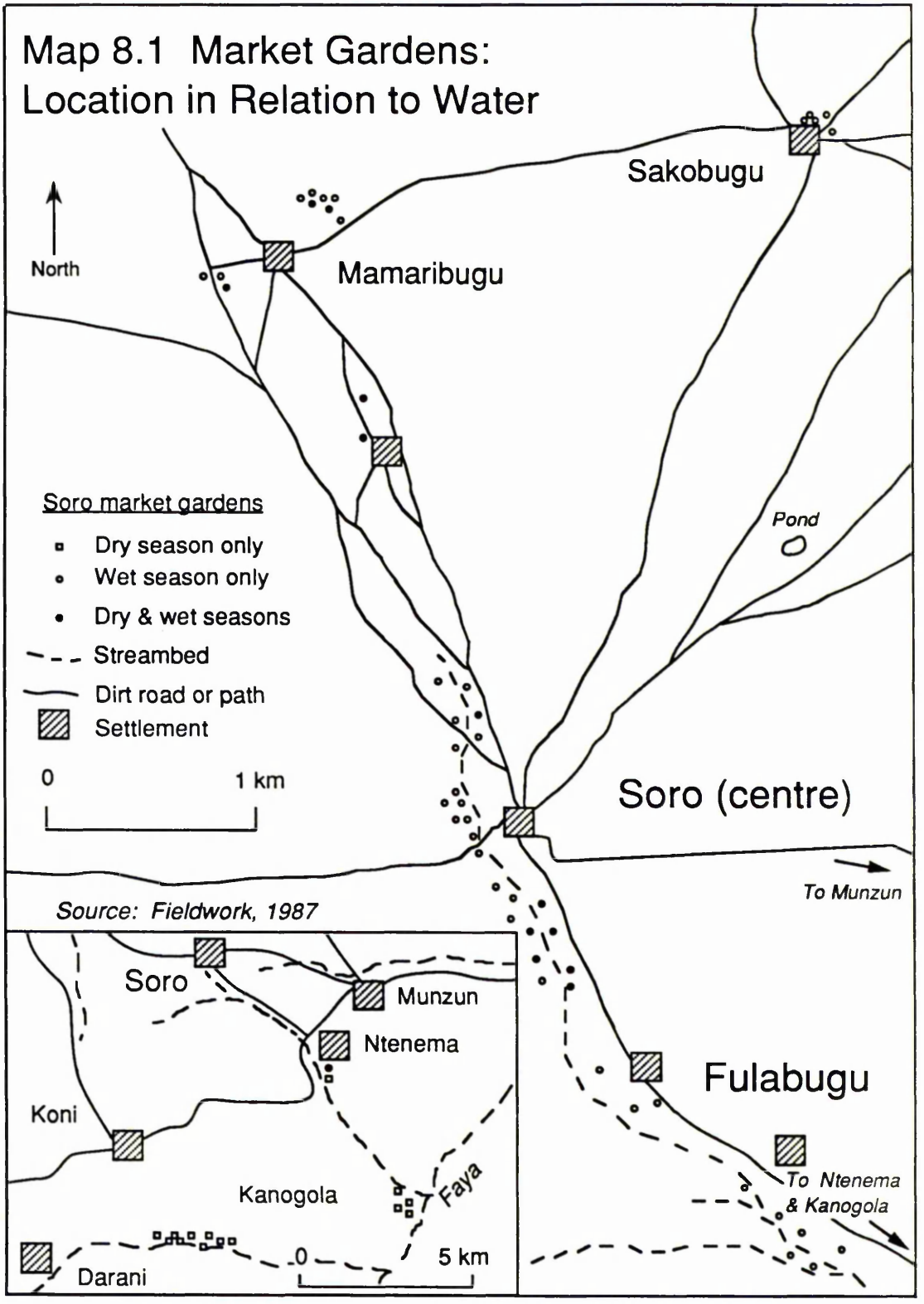
6. An 'active' well is one with sufficient water through May to water garden crops.

7. >20 m from streambed.


Map 8.1 Market Gardens:
Location in Relation to Water
North
Sakobugu
Mamaribugu
Soro market gardens
Dry season only
Wet season only
Dry & wet seasons
Streambed
Dirt road or path
Settlement
0
1 km
Pond
Soro (centre)
To Munzun
Source: Fieldwork, 1987
Soro
Munzun
Ntenema
Koni
Kanogola
Faya
Darani
0
5 km
Fulabugu
To Ntenema
& Kanogola

The figures for the wet season gardens show that it is possible to grow at least some garden crops without access to a well, depending on rain instead of wells for water.[8] The use of well water is a characteristic of Bamana gardens in particular and gardens in West Africa in general[9]; but gardens of both production orientations, market and household consumption, can flourish during the wet season on rain water alone given careful timing of planting and regular spacing of rain storms.

iii. Gender and age.

Since the sauce is a speciality of Bamana cooking and women do the cooking, the *nakò* has historically been a woman's kitchen garden. In the village outside of Wèlèsè-bugu, women were active in year-round garden production, and in other parts of Mali, women dominate gardening (Turrittin

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8. Well digging is difficult and dangerous. In April, a Soro gardener hired a young man from a neighbouring village to dig a well, his fourth in a 0.75 ha fenced plot. The working conditions of boring straight down in a 1 m diameter shaft with only a hand pick (*soli*), and above ground temperatures at 38-44° C are extraordinary and represent a significant bar to expanded gardening in the upland areas. In addition, pulling a bucket of water up 10-13 metres requires considerably more effort than the 2-5 metre depth at Kanògòla.

9. Morgan and Pugh (1969) refer to well-watered gardens in Burkina Faso (p. 350) and as a general West African characteristic of permanently cropped household production (p. 117) and market gardens (p. 518). Bernus (1956:252) described women's carefully tended, watered, dry season *'naquo'* of onion, aubergine, tomato in a Guinean Malinke village. Diawara (forthcoming) and Gallais (1965) have described Dogon market gardening. Akasaka (1973:131) mentions well-watered Bamana gardens in the Wèlèsèbugu area.

1986; Lewis 1979). In Soro, of the entire village population of women age twenty or older, 41% had gardens compared with 57% of the men. Of the 88 persons with a garden (*nakò-tigiw*), only 39 (44%) were women (Table 8.3). There were no dry season women gardeners in 1987. Women were not, however, completely absent from dry season gardening. Wives and mothers worked with their husbands and sons respectively; their husbands and sons watered okra intercropped with tomatoes for them. At Kanògòla, women from other villages were working in the gardens as well as men, but I did not investigate whether they were working in their own gardens or in those of their male relatives.

Table 8.3

Gardeners (*nakòtigiw*) by Age and Gender

	Age*				
	≤20	20-30	31-50	>50	Total
Women	0 (0%)	15 (39%)	12 (32%)	12 (63%)	39 (17%)
Men	2 (2%)	16 (48%)	25 (78%)	6 (33%)	49 (24%)
Total	2 (<1%)	31 (44%)	37 (54%)	18 (49%)	88 (20%)

*Figures in parentheses show the percentage of the entire village population for each category.

The figures show the large participation of men in gardening, with 78% of the 31-50 year old age category having gardens. Fewer younger men, 48% of the 20-30 year old age group and only 2% of those less than 20 had gardens. Before marriage and immediately afterwards, these younger men are often preoccupied with work for their fathers, mothers, and

older brothers. Later in life they may have more time to devote to personal gardens. Older women are one such group who evidently have more time to garden, with 63% of those over 50 having their own garden. With less than 1% of the population under 20 working in their own gardens, the figures show a strong tendency for young people in general not to have their own plot. Again, this is because they are working for their older relatives.

Based on the observations reported in other studies (e.g. Turrittin 1986; Lewis 1979; Akasaka 1973) and the generally accepted Bamana history of gardening, Soro's male dominated garden tending appears to be an anomaly in national terms. That anomaly was easily explained by a Soro woman who said that Soro women cut firewood to sell during the dry season rather than daily irrigating gardens. For her, the risks of firewood sales were lower, the work less onerous, and the timing better suited to the requirements of cooking, washing, and household fuelwood collection. Women appear, thus, to have turned their cash earning activities away from farming and towards fuelwood collection and to a lesser extent, other bush extractive production, e.g. shea butter and baobab leaf preparation. These activities complement the domestic work and household field work requirements. The gardening, especially during the dry season, they have left to their sons and husbands.

The male market gardening is a relatively recent phenomenon. Women farmers in central Soro and Mamaribugu recalled growing rice (*malo*) in the streambed areas (*kò*

kònò) before the drought. The areas currently used for tomato production had been inundated during the rainy seasons in the past. Indeed, the 1974 aerial photograph taken during the drought shows many fenced garden plots along the streambed, while in the 1957 photograph there is no evidence of this type of cultivation. The change in rainfall, coupled with a growing market for garden crops created the conditions for the development of commoditised garden production. At the same time, male gardeners replaced female rice growers in the streambed micro-ecological zone.

While male-dominated market gardening appears to be a recent form of fruit and vegetable production, sauce condiments have long been a feature of local and regional markets (Park 1799), suggesting that gardeners have not just recently become interested in the market. In Soro, about 15% of women of child-bearing age were regular petty suppliers and traders in sauce condiments (*nafènw*) at the Munzun, Sunuguba, and Kasela local markets. Although I did not collect data on trading activities, their participation in this trade contributed much less to their income in comparison with the fuelwood sales earnings. Still, market prices were watched and when they were high women would sell ground dry okra (*gan mugu*), as well as goods originating in the bush.

iv. Conclusion.

The crop type is probably the clearest indicator of a

nakò. In the Bamana language, it has historically meant the 'garden' for the growing of sauce condiments. With the introduction of new fruit and vegetable crops, those that are sauce ingredients are grown in gardens (*nakòw*). If open field tomato and melon growing expands so that single plots are over a half hectare the vocabulary may change, e.g. to *tamati foro* 'tomato field'. For now, in the small commodity-producing peasant plot, gardening (*nakò sènè*), thus, denotes the growing of tomatoes, okra, cucumbers, mangoes, and other fruits and vegetables, and this chapter is concerned with the production of these crops.

The use of well water for irrigating these crops is common, especially during the dry season when it is essential. It is not, however, a necessary characteristic of wet season gardens where only 33% used well water. Wells and watering are a direct response to ecological conditions. They are a necessary part of a garden when the crop's water requirement cannot be met from rainwater alone.

Finally, the data from Soro show that while in the past a strict division of labour by gender may have resulted in an association between gardening and women's work, today this is not necessarily the case. With the advent of commodity production, this agro-ecologically specialised form of farming has been taken over by men. More men (24%) than women (17%) had gardens in 1987. So far, I have treated all gardens as the same in terms of the production goals of the gardeners. In the next section, a clear distinction will emerge between household subsistence gardening and commodity

production, correlating to a strict gender division of labour.

2. Two Types of Garden.

Soro's gardeners grow fruits and vegetables for two reasons: for food that will be consumed by members of the household and to sell in a market. Not all gardens, however, were equally oriented toward household and market. Indeed, they can easily be classified into two types of garden based on the destination of three quarters or more of their produce (Table 8.4). I have chosen 75% of the destination of the harvest as a criterion rather than 100% to account for the household consumption of some vegetables grown by market gardeners.

Table 8.4

Household and Market Gardens

<75% Commercial Produce (Household Garden)	≥75% Commercial Produce (Market Garden)
38 (43%)	50 (57%)

Of the 88 *nakòtigiw* in Soro, most (57%) were commercially oriented. These 50 gardeners are the main agricultural commodity producers and their tomatoes, cucumbers, chili peppers, and other fruits and vegetables are the village's major cash crops. The other 43% of gardeners who may be called household gardeners were not isolated from the market. To emphasise the possibility of marketing their

produce, I have presented these figures using 75% or more of the harvest commercialised rather than 50%. This is because these small producers were prepared to sell whenever the prices rose. The opportunity to make a little cash at the possible expense of a few greens in the sauce would be too good to miss. Additionally, preserved, saleable garden produce--such as dried okra powder (*gan mugu*)--was a food reserve in the larder or served the function of a small savings fund since it could be sold any week in the local market for petty cash.

The garden types are characterised by the gender of the head of the garden (*nakòtigi*) (Table 8.5). Men did not farm household gardens. While produce from their gardens would supplement the household food supply, the primary destination of crops from men's gardens was the market. In only one case did I find a market garden whose *nakòtigi* was a woman, and her husband helped her with planting and weeding. But, whereas it is easy to say that men did not farm household gardens and the tabular data support this, caution must be taken before drawing conclusions from the data on women and market gardening.

Table 8.5

	Gender of Gardener	
	Household Garden	Market Garden
Women	38 (100%)	1 (2%)
Men	0	49 (98%)

Table 8.5 indicates that only one of the market gardens had a woman *nakòtigi*. In men's market gardens, however, wives and mothers often had a stake in the produce. It is important to note here that some crops have a traditional gender association. In the case of gardens, okra, onions, and *da kumu* are essentially women's crops because they are basic ingredients to different kinds of sauces. Okra intercropped in a man's tomato plot might, therefore, 'belong' to his mother or wife. After the tomatoes are planted, a woman may plant okra along the edge of the plot to take advantage of the water being put on the tomatoes. The okra produced in such cases was used either in the household sauce or sold by the woman who planted it. Were the market value of okra or *da kumu* to rise, the gender label of 'women's crops' would likely disappear as male gardeners incorporated a profitable crop into their fields.[10]

The conclusion of this section on the typology of gardens is, then, that garden commodity production is qualitatively different from other forms of agricultural commodity production. This difference stems from the historical relation between gardening, the domestic division of labour by gender where women do all the sauce making, and sauce condiment production. For the latter, there has long been a local market as well as household demand; today, urban and international markets have increased and changed demand.

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10. Guyer (1984:101-116) has shown the role of political power in men's and women's access to commercially valuable crop production to explain the differentiation in men's and women's income earnings.

As discussed in Chapter VI, Women do not have market gardens because they do not have the time to devote to tending the fruits and vegetables. In addition, they do not have the means to transport the produce to markets, an important part of a market gardener's provisions will be shown in the fourth section. When women were growing rice, they sold some of it in markets. Rice, unlike fresh fruits and vegetables, is not perishable and thus can be stored until it is convenient to go to a market. Rice had different labour requirements such that it was a more flexible market crop than fresh fruits and vegetables. In the change of streambed cultivation from women's rice to men's tomatoes, men have capitalised on market gardening at the expense of women's access to the market. Women may have developed fuelwood sales to fill the void in cash income left by the loss of rice farming.

3. Intensive Cultivation Methods.

The horticultural methods of keeping a garden help to set apart the farming of a *nakò* from that of a field (*foro*). Earlier in this chapter reference was made to wells as a characteristic of much gardening, especially dry season market gardening. In addition, I will show in this section that measures to protect plants from pests, and soil additives such as mulch, manure, and chemical fertiliser, are more common in gardens than in open fields. I will propose that the market garden is a site of experimentation in growing methods. As such, it has a greater diversity of domes-

ticated plants per unit area than the fields. Farmers take steps to protect this diversity, which is an investment in experimentation and commodity production, by supplying inputs to improve growing conditions.

i. Experimentation and crop diversity.

I observed over twenty domesticated species of crops in Soro gardens with many more varieties and planted wild species (for complete list see Appendix D and E). Diversity is very common, especially where gardens are fixed in space by the presence of a well and fence. Table 8.6 reveals some of the plant diversity in the enclosed gardens of Soro. Sixteen crops per half hectare does not exemplify unusual diversity for a tropical farming system (Ruthenberg 1980). With the exception of one of the gardens surveyed for this table, most (over 50%) of the enclosed area did not benefit from well water. Instead, most of the area was used for one or two rainfed crops--such as maize, groundnuts, or sorghum. Some of these gardeners considered the large enclosures as a kind of reserve for expanded market gardening when, and if, their technical and labour means should improve.

Changing agricultural land use is not uncommon. All of these gardens stood on land that within the memories of persons over the age of twenty-five was rice-growing lowland. For further examples of the diversity of plants and intensification of production, Appendix E includes the detailed profiles of three gardens.

Table 8.6

Enclosed Garden Species Diversity

Avg. No. Crops and Planted Wild Foods & Fibres	Avg. Enclosed Area (ha)	Avg. No. Wells
16	0.5	3.3

The figures in this table result from an April survey of the gardens of Mamaribugu and central Soro. They include 50% of the enclosed gardens in Mamaribugu and 100% of those of central Soro where daily farming activity was taking place at the time of the survey. It also includes two from central Soro that were not active during the dry season 1987 even though they had wells with water in them. All crops grown in the plot during the year are included, not just those present in April.

The greater diversity of crops tended to be in the gardens of more experienced gardeners who had used some of the modern techniques promoted by the state extension service. Of the twelve gardeners (26% of the market gardeners) with 15 or more crop species during the year, the average age was 43[11] and all had been gardening for over ten years. Among the farmers of the twelve gardens with greatest crop diversity, manure, chemical fertiliser and pesticide, grafted mangoes, and interest in expanding production and acquiring new tools such as pumps or tillers were all common characteristics. Modern methods will be discussed further below.

Among the horticultural methods employed by the gardeners that indicated an interest in experimentation was the use of seedling beds and transplanting. Seedling beds were most common for tomatoes and Bamana augergine (*nkòyò*) during both the dry and wet planting seasons. Of the 12 market

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11. The average age of the 47 market gardeners was 35 years.

gardens surveyed in April, 50% had tomato, 25% *nkòyò*, 7% okra, and 8% chili pepper seedling beds. They were covered with straw to retain soil moisture.

In several *nakòw*, gardeners had built a tomato seedling bed table (*tamati ga*). The seedling tables offered certain advantages: 1) protection against pests--especially, goats which would not be as likely to get into the bed when other plants were accessible--and 2) moisture retention in the mud (*bògò*) lined tub structure filled with soil richly fertilised with organic material. Tending the seedlings was easier since the seedlings were raised to table height. In addition, the lip of the tub (approx. 7-12 cm above the planting surface) served as an ideal support for straw laid over the seeds or seedlings, improving shading to retain soil moisture necessary for germination. Even given these advantages, seedling care did not seem to warrant the effort of constructing the table. In at least three gardens, the tables had fallen into disrepair, suggesting that they had been tried in the past and were not worth the effort.

A farmer from Household XIV had begun specialising in nursery sales, growing tomato, *nkòyò*, cucumber, and chili pepper seedlings for sale. He sowed tomato seeds at two-week intervals, in order to have plants available for himself and his customers that would be harvested at intervals (Photo 8.1). The value of using seedling transplants to produce earlier season harvests was recognised for all of the garden crops, and at least two farmers were beginning to market the seedlings and immature plants themselves. Sales

Photo 8.1 Tomatoes at
Different Stages

Photo 8.2
Manured Tomatoes

Photo 8.3
Tomato Harvest

within the village, though, seemed to be looked down upon and the nursery growers were giving away their seedlings to friends. In late May, two weeks before the grain planting started, one 20 cm chili pepper plant sold for 15FCFA, one m^2 of 10 cm tomato seedlings (*tamati miyenw*) sold for 660FCFA. Prices varied according to the maturity of the plants, the more mature being more expensive.

By raising seedlings, this nursery grower, whose *nakò* was on a well-travelled road to which farmers from other villages had easy access, was making it possible for local farmers to grow wet season tomatoes (and other crops) without having to carefully tend the delicate seedling plots during the germination and early development phases. By obtaining seedling transplants, farmers could not only save time and effort to devote to other tasks, but could have relatively mature tomato plants established by the time the rains started. This early start would mean that tomato growers could concentrate their efforts on the millet and sorghum fields, while at the same time growing tomatoes which they could begin to harvest just before the market became flooded with fruit and the prices began to fall in September-October (see Figure 8.1).

In this way, the use of transplanted seedlings in market gardening represents a form of intensified production. Specialisation in nursery growing is a marketing adaptation to supply market gardeners with seedling transplants, enabling them to plan their planting in the wet

season even if they had other demands on their time.[12]

ii. Plant protection.

After the last rains of a season, usually in October, the air, soil, and plants begin to dry out. By the end of November when most wild grasses and annual herbs in the bush and millet in the fields have yellowed, the only green areas are where surface water remains standing in streambeds and in gardens where farmers are watering crops with well water. These areas are ecological islands, supporting plants which require regular soil moisture. As plant refuges, they also attract many pests which attack the garden crops. Among the most damaging of the pests are mammals, both domestic and wild. A stray goat that finds its way into a garden can destroy crops in a few minutes which have been grown through the investment of many hours of hard labour.

Besides goats, wild rabbits were cited as the worst pests. Their damage to cucumber, melon, and okra was a common sight. The primary reason for enclosing gardens in a fence (*jesa*) is to protect the garden from these animals. Although the *baganin* (Jatropha curcas) which is planted to make the fence or hedgerow is barb-less, gardeners often en-

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12. The purchase of mango slips from outside the village represents another form of transplanting. One farmer in Household II bought 68 *mangoro kuw* 'mango slips' from a friend in Kasela for 1000FCFA. The market price, had he not gone through a friend, would have been 150FCFA per slip, or 10,200FCFA, a prohibitive price to invest in a crop like mango with such a slow return.

couraged the growth of thorny plants or used their cut branches, such as *surukun tombòlòn* (Ziziphus mucronata), to help discourage invasion by crop eating animals. Within the enclosure, some crops, mostly seedlings, were protected by thorny branches as a second line of defense in an attempt to keep rabbits away. I saw one metal spring-action trap used against rabbits, but few other measures besides vigilance were, or could be, taken.

100% of the dry season market gardens were enclosed, but during the rainy season, 23% of the market gardeners were growing unfenced tomatoes. Those growing unfenced tomatoes were expanding beyond their fenced territory. In the enclosed areas, some farmers grew other crops besides market fruits and vegetables, such as dryland maize, groundnuts, and sorghum. Within the largest enclosure of 1.5 ha, 75% of the area was used to grow maize and sorghum, 15% was a mature mango grove, 5% was a streambed that was not arable, leaving only 5% of the area where tomatoes and other garden crops were grown using well water. This enclosure was, however, unusual since the next largest was only half its area.

Other anti-pest methods included a scarecrow (*kònògènè*) in a tomato patch complete with military uniform. One farmer reported using *seretoro* (Ficus capensis) leaf powder as a poison (*fura*) against *dumaw* 'worms' on tomatoes. Others dusted cucumbers with an unidentified manufactured chemical pesticide purchased in local markets.

Staking tomatoes (*yiri turu tamati kòrò*) occurred when

the plants began flowering and before they began to bear fruit. The favourite stakes (*kumaw*) were lightweight *npala-npalan*, keeping the fruit off the ground and increasing the density of a plot. The bed (*plan* from *planche* 'bed'[Fr]) were usually rectangular 1-2 m wide by 2-5 m long of raised (15-30 cm) soil. The lip was higher than the planting surface, cupping water toward plant roots. The whole bed was subdivided into a double or single row of 4-12 plants.

Fencing, using pesticides, and staking are all further agronomic measures that have intensified market garden production. The fences are a prerequisite for dry season market gardening to protect crops from livestock. Like staking, fences do not cost anything and the materials are readily available. They define a plot's boundaries very clearly but they are not permanent fixtures. Farmers frequently change--extend or abandon--fences to adjust to the protection needs of crops. Still, within the fence, gardeners have their own territory where many seemed to enjoy spending time.

iii. Fertiliser use.

Like hand watering from wells, the use of fertiliser inputs was mentioned by gardeners as a farming method characteristic of gardens. Farmers in Soro used three kinds of fertiliser: kitchen and courtyard waste (*nyaman* or *sununkun*), manure, and chemical fertiliser (N-P-K[13]). Although

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13. 12% nitrogen, 22% annhydrite of phosphate, 12% potassium, 7% sulfur

only 3% of millet and sorghum growers fertilised their major field crops (Table 7.3), the greatest use of fertiliser was on market garden crops. As presented in Chapter III, von Thünen's theory of agricultural intensification applies with modification to the Soro version of Bamana farming.

The land use continuum (Table 6.1) is, however, more appropriate for conceptualising agricultural land use since it is linked to natural resources. Production of foods and fibres is, in the continnum, increasingly intensified from the collection of plant and animal materials in the bush, to the extensive cultivation of grains and legumes in dryland fields, to the garden plots of enriched soil. Among Soro farmers in general, those that were already practising a variety of modern methods were more likely to use fertiliser.

Gardeners used about 100 kg *nyaman* per 25 tomato beds or 375m^2 at the initial bed (*plan*) making stage, before seedlings were transplanted. All gardeners considered its use basic to the preparation of a tomato bed. I estimate that total village use of *nyaman* was about 14 tonnes on tomatoes, or 2.7 t/ha (Table 8.7). For comparison with the grain crops, *nyaman* was used in 69% of the maize fields (Table 7.3). The rate of application was about 940 kg/ha, but the rates varied depending on numerous factors, including supply of *nyaman*, distance from compost heap to field, access to donkey cart, and motivation to fertilise maize. Millet, sorghum, and fonio, plus the legumes, received no compost.

Table 8.7

Estimated Fertiliser Use (figures are approximate)

	Waste Compost	Manure	Chemical (N-P-K)
Tomato	14 t; 3 t/ha	2 t; 400 kg/ha	100 kg; 20 kg/ha
Maize	10 t; 1 t/ha	passive	200 kg; 20 kg/ha
Chili Pepper	<1 t	?	200 kg; 115 kg/ha
Cucumber	1 t; 3 t/ha	?	<100 kg; 30 kg/ha
Other	4 t	<1t	100 kg; 35 kg/ha

Like *nyaman*, cattle manure (*misibò*) was used on tomatoes at the bed preparation stage. Some gardeners, however, added manure after the seedlings were in the ground and even again when the plants were beginning to form fruit (Photo 8.2). All tomato gardeners in Household IX used one application of manure when the plants were 10-20 cm. high. They used manure from the cattle owned by their head of household. Over 95% of the gardeners obtained their manure in this way. Access to manure was necessary for successful tomato gardening, so those tomato growers from households without any cattle had to obtain it through a friend. Other crops, especially okra, were intercropped with tomato, taking advantage of the manuring and, during the dry season, the irrigating.

The estimated rate of manure application on tomatoes was approximately 400 kg/ha. Unlike the practice of 'passive' manuring of grain fields by allowing cattle to graze on fields during the dry season, manure put on market garden plots was collected in corrals and therefore concentrated. It was also broken-up, and worked into the soil with a hoe

to improve its accessibility to plant roots.

In addition to cattle manure, donkey manure (*falibò*) played a minor role in soil improvement. The largest of the eight grape growers, with two mature vines covering a 15 m^2 trellis (*ga*), applied only donkey manure after harvest and pruning, preferring its high straw content and compactness to the blending quality of cattle manure. He had learned the special regime (see Appendix D) of manuring, watering, and pruning in Senu, a village near the Bamako international airport where crops like grapes oriented towards air export to western Europe are grown. Farmers used donkey manure only on grapes, the most recent crop introduction in the village. In this way, grape production exemplifies experimentation where a potentially profitable market outlet exists.

Like manure and compost, N-P-K fertiliser was used only on maize fields among the grain and pulse crops.[14] Chemical fertiliser differs, however, from *nyaman* and manure in respect of its cost. Soro's gardeners recognised the need for calculating the cost of inputs in comparison with the value of the cash crop when using chemical fertiliser since it was the only major input expense. Manure and *nyaman* cost nothing. In light of that, it is not surprising that the most N-P-K fertiliser was put on chili pepper, the most valuable crop per unit area. Chili pepper's estimated 115 kg/ha N-P-

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14. I knew of two exceptions to this. Chemical fertiliser was used on an intercropped maize and sorghum field and on a groundnut field.

K application is much greater than the rate for tomato. Farmers said that the response of tomatoes to the chemical fertiliser did not warrant the expense of using it. Cucumbers and melons also responded well to N-P-K.

Chemical fertiliser could be purchased in local markets, e.g. Munzun and Kasela, at the price of 1 kg. for 175-200FCFA. Gardeners especially used it on chili pepper just after the rainy season (*kawule*). One chili pepper grower (Household IV) reported using 80 kg of N-P-K on his chili pepper during *kawule* (September-October) in 1986, representing an investment of 14,000 - 16,000 FCFA, or about 2% of the value of the harvest. The same farmer used 2 kg N-P-K every ten days on his cucumbers.

In Sakobugu, green beans were part of the late season (Sept-Jan) commercial crop range, and were fertilised with chemical fertiliser.[15] On contract with a Bamako-based merchant, one grower received 26,045FCFA on 29 January 1986 for his green beans, minus 1550FCFA for seeds and 1500FCFA for fertiliser. His expenses for inputs were, therefore, 11.8% of the value of his harvest, 6.0% for seeds and 5.8% for fertiliser.

iv. Conclusion.

The most intensive farming methods occurred in the

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15. In response to my enquiries with regard to green beans being more popular in Sakobugu than central Soro, the Sakobugu farmers responded that it could be related to the presence of a scale for weighing the harvest in neighbouring Nkònikò.

market gardening sector. Among dryland field crops, maize received considerable fertiliser inputs and protective fencing. As I showed in the last chapter, this is due to its agronomic requirements--high nitrogen use, and the agricultural calendar--it is planted early in the season and therefore needs protection from free range livestock. Market garden crops benefited from farmers experimenting with new crops and methods. Fertilising and hand watering from wells were two major inputs that gardeners could afford in terms of time, physical effort, and capital investment. Because gardeners were reaping a cash return on their labour and capital investments, the market garden was where the most rapid changes toward intensification and innovation were taking place. Before further discussion of intensification and innovation in agrarian change, I will show how vegetable and fruit farming is oriented toward the market rather than household consumption.

4. Market Orientation.

The growing of sauce condiments and other specialty crops for markets has long been an incentive for gardeners in West Africa. Watts (1983:61) makes reference to market gardens in nineteenth century Hausaland thriving where 'edaphic and market conditions permitted'. In this section, I will show that Soro garden production is directed at markets, and how the marketing organisation of village produce puts the burden of risk largely on the peasant producers.

i. Local markets and transportation of produce.

Soro is within a zone of regional weekly markets.[16] The local market schedule is the following: Munzun (Monday), Marakakungo (Tues.), Bugula and Kuraba (Wed.), Sunuguba (Thurs.), Faako (Fri.), Kòni and Muntugula (Sat.), Kasela (Sun.) (Map 8.2). Of these Munzun is closest but is a small, local market. Kasela is the closest large market, where goods are bought and sold and regular meetings with friends take place. The Sunuguba market also regularly attracts Soro residents as does Kòni.

There is no market in Soro itself, but Munzun has a small market on Mondays. This closest market, however, appeared only once[17] in 44 interviews with farmers as a sales point for goods produced in market gardens (Table 8.8). On the other hand, the second most often cited market, 63% of those responding, for fruit and vegetable produce is not even considered a regional market and has no weekly flux of sellers. It is a daily market at the intersection of the Bamako-Segu highway and the road leading to Baginda. That

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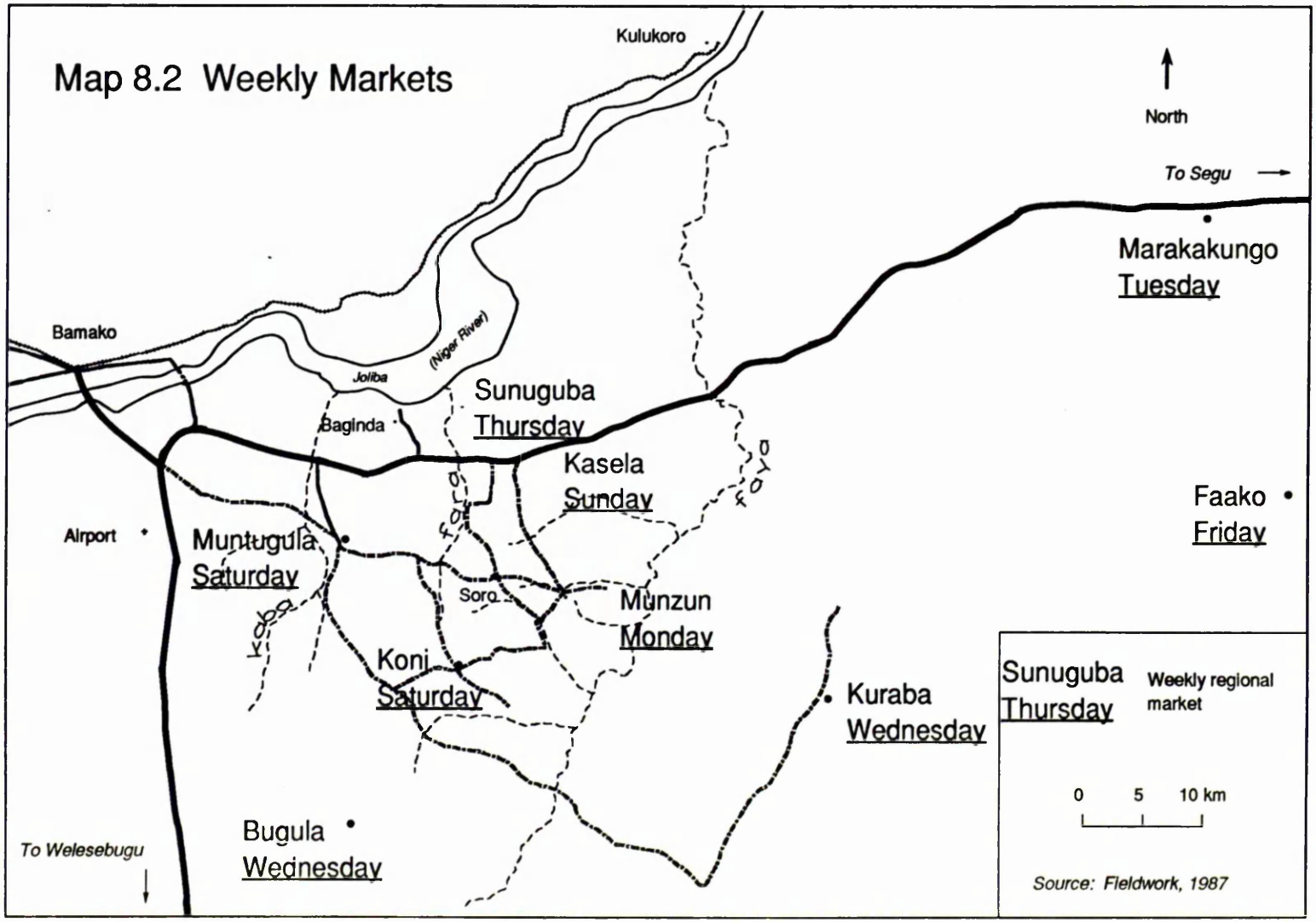
16. The Bamana word for week, *dògò* or *dògòkun*, is derived from the word *dògò* 'market'. *sugu* is also commonly used to designate market and is believed to be derived from the Arabic *suq* 'market'. The contemporary Bamana names for the days of the week are also derived from Arabic. On weekly markets in West Africa, see Hodder and Ukwu, 1969:60.

17. The one *nakòtigi* who mentioned the Munzun market did so with reference only to selling his calabashes (*filenw*), of which he had produced a bumper crop (hundreds) in 1986. The market for *filenw* is bigger in the countryside than in Bamako where plastic and metal basins have become popular.


Map 8.2 Weekly Markets
Kulukoro
North
To Segu
Marakakungo
Tuesday
Bamako
Joliba
(Niger River)
Baginda
Sunuguba
Thursday
Kasela
Sunday
Faako
Friday
Airport
Muntugula
Saturday
Soro
Munzun
Monday
Koni
Saturday
Kuraba
Wednesday
Bugula
Wednesday
To Welesebugu
Sunuguba
Thursday
Weekly regional market
0 5 10 km
Source: Fieldwork, 1987

market, at Pieni[18] the intersection, was the most used because of its convenience combined with the relatively high price for its produce that was sold to urban-based highway users. The location is where cars travelling the Bamako-Segu route frequently stop because the prices are lower than in Bamako.

Table 8.8

Markets for Fruit and Vegetables.

Market	% Respondents Citing
Falajè (Bamako)	58
Jalakòròbugu	8
Kasela	76
Muntugula	24
Munzun	3
Pieni	63
Sirakòrò	8
Sunuguba	24

Although Pieni was commonly mentioned, the markets at Kasela and Falajè were preferred for separate reasons.[19] Falajè marks the southern outskirts of Bamako. It is within

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18. The name is derived from the French word *pied* 'signpost' located at the road junction marking the turnoff to Baginda. The adjacent village is Kobalakòrò.

19. Falajè, named for the local *fala*, is a customs stop for trucks entering Bamako from the south. Today its appearance is dominated by parked trucks at the intersection of two national highways, one leading east to Segu and points further east and northeast such as San, Mopti, and eventually Gao; the other leads south to Buguni from which it veers east to Sikaso, the main route linking Bamako with Côte d'Ivoire and Burkina Faso.

the District of Bamako boundary, and it is the beginning of a continuous road of businesses leading into the heart of the city. Falajè prices are higher due to its location at the edge of the city, but it is nearly 30 km from Soro. Kasela is only 7.5 km away and is a full regional, but only weekly, market where Soro residents have established social contacts. Gardeners sold their produce at markets depending on two major factors: distance to the market and price. As Map 8.3 shows, gardeners were willing to take their produce further to attain a higher price.

Closely linked to the most appropriate markets for selling fresh produce is the means to transport the goods to market. Without refrigeration, farmers lack the means to preserve ripe fruit once it is harvested. They depend on selling their produce within 24 hours of harvest. Since the village itself offers no market, they must have a means to evacuate the produce. Either they sell it to a trader who drives a truck to the field, or they must take it to a market to sell it to a trader.

Table 8.9 shows the widespread ownership of bicycles and tomato crates, the principal means of transporting produce. The number in parentheses is the percent of gardeners.[20] One or two 12-13 kg capacity crates (Photo 8.3) fastened to the back of a bicycle was the most common way of moving fresh produce to market. Access to a bicycle

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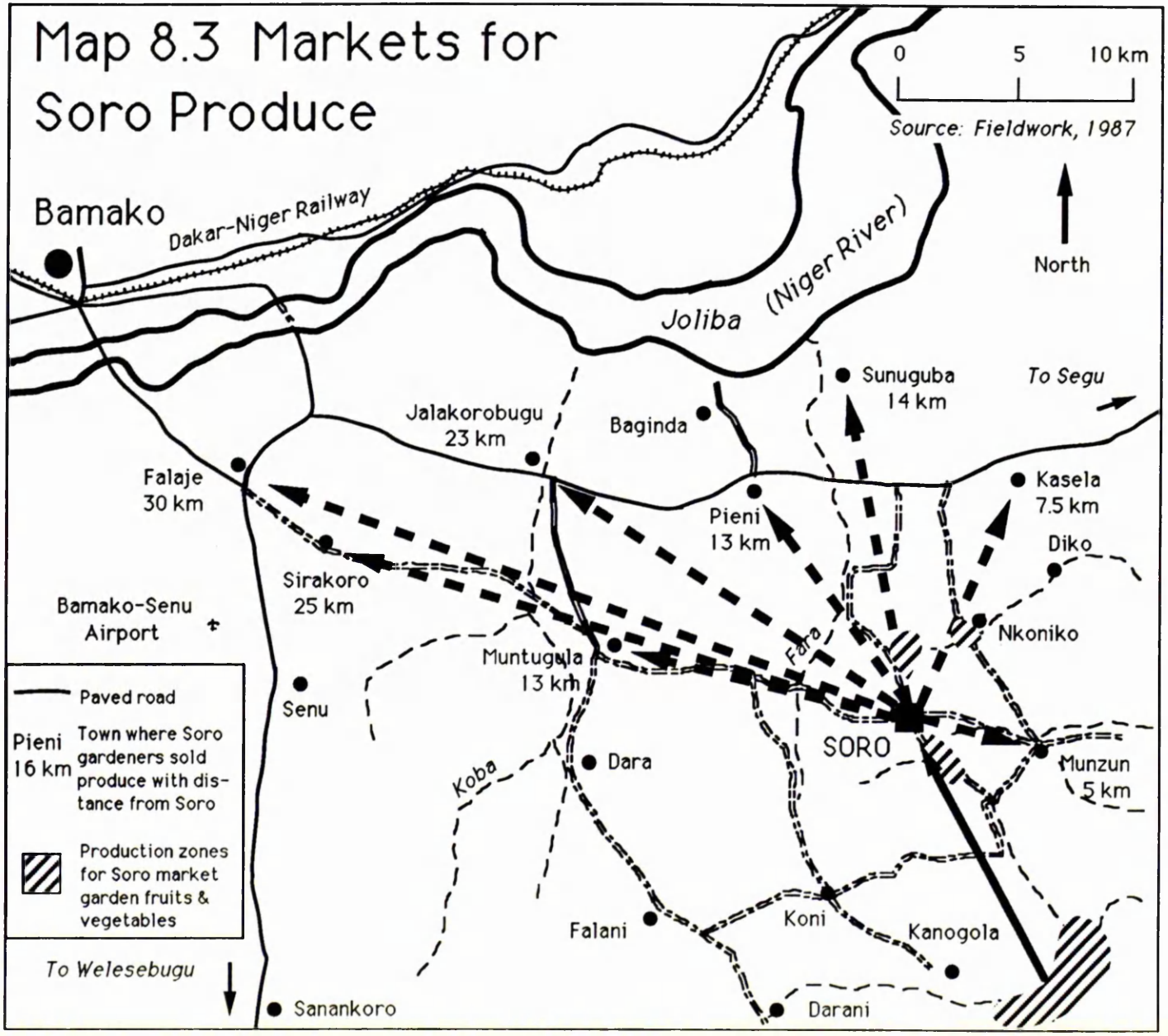
20. In the interviews of all market gardeners with a plot (*nakòtigiw*), 40 responded to the question on transportation, and 28 respondents to question on crates.


Map 8.3 Markets for Soro Produce
0
5
10 km
Source: Fieldwork, 1987
North
Bamako
Dakar-Niger Railway
Joliba (Niger River)
Sunuguba 14 km
To Segu
Jalakorobugu 23 km
Baginda
Falaje 30 km
Kasela 7.5 km
Pieni 13 km
Diko
Sirakoro 25 km
Bamako-Senu Airport
Nkoniko
Fara
Muntugula 13 km
Senu
SORO
Munzun 5 km
Koba
Dara
Falani
Koni
Kanogola
Darani
Sanankoro
To Welesebugu
Paved road
Pieni 16 km
Town where Soro gardeners sold produce with distance from Soro
Production zones for Soro market garden fruits & vegetables

and a crate was thus essential to market gardening. The gardeners averaged 1.8 crates per gardener. The five gardeners who reported having no crate indicated that they had no problem in borrowing one from a friend or relative when they needed one. One gardener had six crates.

Table 8.9

Means of Transportation

Bicycles[21]	Mopeds	Motorscooter	Carts	Crates[22]
34 (85%)	6 (15)	1 (2.5)	4 (10)	53

When beginning to garden, inexperienced gardeners with no bicycle face a transportation problem. They either must borrow the bicycle of a friend or relative, or sell their produce in the field to traders. Some young men in poorer households may find barriers to market gardening if there are no bicycles available in the household. Transportation is also a barrier to women's involvement in market garden production. No women in Soro owned a bicycle.

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21. Some gardeners had a bicycle and a moped, but mopeds were rarely used for transporting produce due to the cost of fuel (340FCFA/litre). Some shared bicycles and therefore the survey may have picked up the same bicycle from two respondents.

22. A crate (*kèsi* [from Fr. *caisse*] was made of thin wooden boards, with one dividing board in the middle. The dimensions of each half were 16 x 26 x 32 cm. Each half had a 13,312 cc^2 area or approximately 6-6.5 kg fully loaded with tomatoes.

When large harvests needed to be evacuated in bulk, a farmer had several options. Donkey carts, of which Soro had a total of four in working order and three broken, were used to carry larger loads of tomatoes to Kasela or Pieni. When the tomatoes of some of the big producers of Household IX were ripe, traders' *bâchés* 'covered pick-up trucks' came directly to the fields to purchase. Traders also drove to the fields at Kanògòla during the dry season. Gardeners had to weigh the costs and benefits of transporting produce to markets against selling produce at lower prices in the fields to traders.

Only tomato harvests were sufficient in bulk to warrant the field visits of traders. Chili peppers and cucumbers were transported in 50 kg sacks tied to the backs of bicycles. Melons were harvested during the dry season and carefully taken to Kasela or Pieni where they were sold individually. Until now, mangoes, too, have been sold in this way. With more and more trees being planted and the expanding foreign markets, improved harvests and transport are sorely needed (Jeune Afrique Economique, April 1988). By late May, large piles of mangoes were rotting along the highway from Pieni to Kasela. At the same time, interior Malian markets such as in Tonbuktu and Gao remain untapped due to the poor transportation and market development, leading to the observation that it is easier to find a Malian mango in Paris or Brussels than in Tonbuktu or any other Sahelian city (Bagayogo 1982:255).

ii. Prices.

Peasant growers in Soro dealt directly with traders in Kasela and other market towns where they took their produce. There, they sought the best return for their products. For tomatoes, the produce would be taken into Kasela by bicycle in two crates. A buyer would inspect the produce and offer a price. The produce would not be weighed. The producer-seller and buyer would agree to a price, 1000-3000FCFA per crate (Table 8.10), which fluctuated according to supply which changed seasonally. The buyer, usually a woman, would sell the tomatoes to drivers, men--taxi drivers doubling as small time traders or merchants--bound for the Bamako or Segu urban markets where they would re-sell the fruit to market sellers (usually women).

Table 8.10

Fruit and Vegetable Wholesale Prices,
Soro Markets, 1987 (Approximate)

Crop	Price per Kg (FCFA)	Notes
Chili pepper (*foronto*)	350-1000	1 *bòrè*, 5-25 kg, price: 5000-8000FCFA
Tomato (*tamati*)	77-312	1 *kare*, 26x16x32 cm, 12-13 kg, price: 1500-3750
Cucumber (*kònkòn*)	10-250	1 *bòrè*, 5-25 kg, price: 500-3000
Green Bean (*hariko ver*)	175-180	
Melon	95-240	1 fruit, 0.75-0.80 kg, price: 125-300
Grapes (*rèzèn*)	500	
Mango (*mangoro*)	20-40	4 fruit,1.8-2.0 kg, price: 100FCFA

Like the wholesale price, the retail price depends largely on the buyer evaluating the goods and offering a

price relative to what consumers will pay for the produce, rather than with reference to a set value per unit. Seasonal fluctuation of supply greatly affects the Bamako prices as is reflected in the monthly Bamako consumer prices for fresh tomatoes and Bamana aubergine (*nkòyò*) 1984-87 (Figure 8.1). The texture and appearance of the produce are also important criteria affecting the price of produce.

Many of the cucumbers grown in Soro in 1987 were a mottled yellow and green, 10-15 cm, <150 gm, and partly curled at the tip. These, especially common where chemical fertiliser had not been applied, were sold in local markets like Munzun and Kasela for only three for CFA 25 at best.[23] Some were eaten in the fields or distributed to friends or household members.[24] In contrast, dark green, firm, 20-30 cm, 280-300 gm cucumbers sold retail for 50FCFA each in Baginda, and up to 100FCFA each in Bamako's markets[25].

Green bean prices were an exception to the more widely fluctuating fruit and vegetable market prices that were very sensitive to local market supply. Unlike other crops for which a West African market exists in cities like Bamako, Segu, Abidjan, and Dakar, Soro's green beans were destined for overseas export. They were weighed and sold by the

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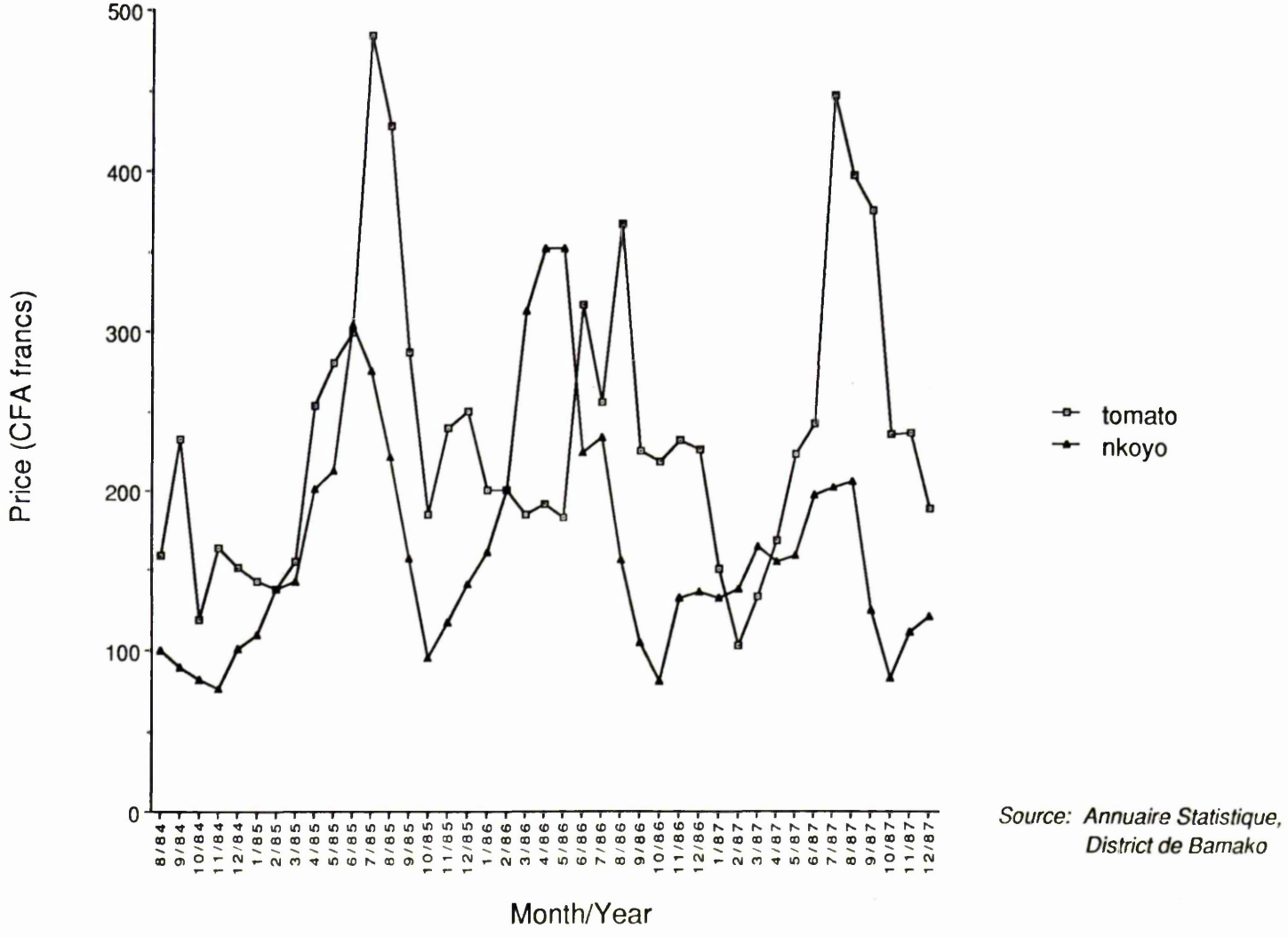
23. We bought about two and a half plastic bags full (approx. 2.5 kg) of 10-20 cm green and yellow-green cucumbers for CFA 300 from a Soro gardener. Disappointed with the harvest, he was going to give them to a friend to sell in Kasela for CFA 250.

24. Cucumbers, relatively new outside urban areas, do not have a very well defined role in Bamana cuisine.

25. For example, *suguba*, *madina kura*, and *badalabugu*.

Fig. 8.1 Bamako Tomato and Nkoyo Prices, Aug. 1984-Dec. 1987



Source: Annuaire Statistique, District de Bamako

kilogram. Green beans, as I showed above, are grown on a contract basis with a Bamako trader. The trader depends on the quality of the appearance of the beans to compete in the international produce market.

Figure 8.1 also shows that the highest prices for tomatoes occur during the peak dryland labour demand months (July-August). At this time, most market gardeners are preoccupied with grain production. Moreover, to harvest tomatoes during these months, they must be planted during the dry season. As discussed above, dry season production is very labour intensive and requires the coordination of inputs. Both tomato and Bamana aubergine (*nkòyò*) prices are lowest during the rainfed crop harvest period (October-November). Dry season gardeners are thus rewarded with higher prices for their produce during the wet season. By planting during March and April (Photo 8.1 was taken 22 April), Soro tomato producers were harvesting during the period of the highest prices.

The prices in Table 8.10 give some idea of the potential incomes that Soro growers obtained when combined with harvest figures (Table 8.11). Five growers were earning over 200,000FCFA, and one up to 500,000FCFA (approx. £1150). Who were these tomato producers? Two-thirds of them had year-round operations, capitalising on dry season, well water irrigated gardening to complement their rainy season gardens. They owned four of the seven (57%) motor bikes.

Of the other three, two were owned by the Qur'anic teachers (Households XIV and XV) who were also market gardeners, and one by a forty year old farmer who had worked for three years in Ghana, Côte d'Ivoire, and Nigeria as a driver (Household II) and until 1987 had been a productive market gardener.

Table 8.11

Tomato Production Figures: Estimated Harvests and Earnings of 15 Largest Producers in 1986-7[26]

	Crates (Household)	Kg	FCFA (1000)
1.	280 (IX)	3360-3640	490
2.	220 (IX)	2640-2860	385
3.	142 (IV)	1704-1845	248.5
4.	100-140 (IX)	1200-1820	175-245
5.	120 (I)	1440-1560	210
6.	80 (IX)	960-1040	140
7.	80 (IX)	960-1040	140
8.	80 (XII)	960-1040	140
9.	80 (XIV)	960-1040	140
10.	70-80 (VII)	840-1040	122.5-140
11.	70 (XIV)	840-910	122.5
12.	50 (I)	600-650	87.5
13.	50 (IV)	600-650	87.5
14.	50 (IV)	600-650	87.5
15.	50 (VI)	600-650	87.5
Total	1522-1642	18.26-21.35t	2663.5-2751

Significantly, though, the biggest tomato producers came from the largest households (I, IV, VII, XIV, IX each had over 35 residents), and among those households they came from those that organised their household labour to work the

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26. These are the figures taken from interviewing responses. They do not include tomatoes eaten by the household, only those sold. Two or three other growers may have produced over 600 kg of commercial tomatoes. In the interviews, some gave low figures for the scale of their operations or did not keep track of how many crates they sold.

household field (*forobaforo*) during a limited period of time leaving the rest of the working hours free for market gardening (IV, VII, IX--Table 8.11). Grains, of comparatively low market value (Coulibaly 1985), are primarily subsistence oriented, while the more profitable garden crops are grown for cash. In the next section, I will show how some gardeners appear to profit from innovative work schedules that allow them to work with a large corporate group to grow subsistence grains for a limited part of the day during the three months of the rainy season, thus leaving a block of time for smaller group market gardening.

5. Innovative Organisation of Time.

Market gardening in Soro is an intensified use of time and space. Changes in the organisation of labour have made this possible. Intensification of agricultural production has been linked to changes in the existing socio-economic organisation, or technology to increase agricultural production per unit area (see Rigg 1986:29, 35-6; Brookfield 1984:39, 1972:31-2). In Soro, the development of market gardening 'around' the area and the time necessary for the dryland household food production is a farming adaptation that expands the income-earning opportunities of men other than the head of household.

i. Gardening and farm size.

Gardening increases as the size of farm--here the number of people in a household (*du*) working a common field--

increases (Figure 8.2). These data provide evidence that with more people in the household, there are likely to be more market gardeners. This simple relationship shows an arithmetic increase in the number of garden heads as household size increases. The point deviating furthest from the mean is a FulFulbe household in which there were no gardeners. Two explanations can account for this: one, the large number of unmarried daughters in the family who would be very unlikely to garden, and two, the large herd of cattle owned by the head of the household which requires labour time from the men and which as a commodity is worth much more than a market garden.

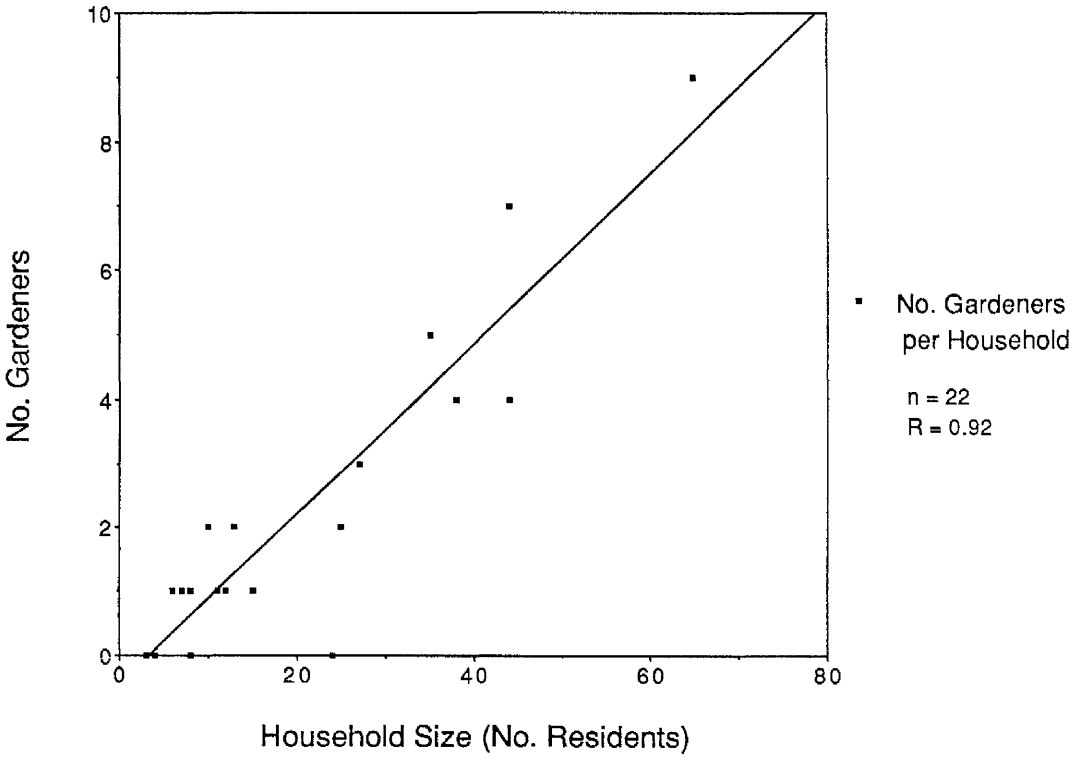
Figure 8.2 also suggests that a large household may be quantitatively different from a small household, but that it is not necessarily qualitatively different. The size alone of a household does not change the likelihood that a member will garden. The opportunity to spend time working in the garden, though, is more likely linked to farm size.

ii. Farm size and market garden production.

The top tomato producers tended to come from large households. Of the fifteen largest producers of tomatoes listed in Table 8.11, 87% came from the four largest households. Taken separately, the organisation of household agricultural work time in these households supported gardeners in different ways.

In Household IX, gardeners benefited from the lowest average hours per worker per day input for the household

Fig. 8.2 Gardeners Per Household



field (*forobaforo*). With only 4.4 hours per day required in the household field compared with a village average of 6.4 hours for men, market gardeners were free from their household agricultural commitment at just after noon if they started working before 8 a.m. The labour input data per garden that we collected are insufficient to present in tabular form. Generally, men with gardens were working in them when not in the household field, so the shorter the hours required in the household field, the greater an individual man's margin for working in a garden or personal grain field. All the gardeners in Household IX spent some of their non-*forobaforo* work hours in dryland grain farming on individual fields: their mothers', their fathers', their older brothers', or their own. Still, they gained time to work in their gardens due to the short household field hours.

Market gardeners in Household IX also benefited from a large household labour force, a maximum of 52% of the household residents. In that labour force, women worked the same hours as men, the only such household in the village.

If an advantage for gardeners of Household IX's labour organisation was its low daily per worker household field labour requirement, Household XIV stood out as the last to start sowing its *forobaforo*. It started on 2 July, 25 days after the first household fields were being cultivated. This lapse allowed those gardeners who did not have work

obligations on others' fields the freedom to structure their time to their own advantage. They could start their rainy season gardens before any *forobaforo* work started. However, because the *forobaforo* was ultimately not large enough to feed the entire household for the next year, each sub-household unit formed by each married brother of the head of the household had to have a substantial grain field. Work on these personal fields (*jònforow*) started when the other villagers started their household fields. Still, having the fewest household field work days during the first two and half months of the rainy season meant that the heads of these household subdivisions could manage their time so as to favour their market gardens.

Household IV also started its *forobaforo* late (18 June), ten days after the first households began sowing. It was followed by only two later households: XIV described above and XX with no gardeners, considerable hired *tòn* labour to compensate for the late start, and the largest cattle herd. Once started, Household IV had regular work-shifts of 6.1 hours per day for men, just under the average of 6.4. Gardeners in Household IV may have benefited from a high input of women's labour in the *forobaforo*. With 30% of the daily worker hours (no. workers multiplied by hours they worked) contributed by women, Household IV was second only to a small household in which two women did 57% of the household field work time. The larger proportion of women's labour subsidised the men's market gardening time.

Large households in general may thus support extra-

household enterprise through an efficient use of time. In Household IX, an economy of scale may have been reached, but this would be hard to prove without more detailed information on how household members met their subsistence needs and other examples of farms organised in a similar manner. To be sure, not all large households aid market gardeners. The head of Household I with 38 members, the fourth largest in the village, discouraged market gardening by imposing long work hours in the household field. Household I men worked an average of 7.1 hours per day compared with the 6.4 hours average.

Also in contrast to the observation that larger households supported individual commodity production, some of the smaller households supported successful tomato producers. Among the 15 largest tomato producers (Table 8.11) was the head of Household VI with twelve members. He was an especially energetic gardener, had the assistance of his younger brother, and maintained market gardening production during two seasons. The only other major tomato producer from a smaller household--15 members--was the head of Household XII. He also grew tomatoes during the wet and dry seasons.

iii. Selling labour or crops: migration or commodities.

Some household heads saw the proliferation of market gardening units as a threat to their hold over household capital (*foroba*). Some, without openly conceding that such market opportunities helped keep the young men within a single, united household, implied that the personal production and sales of agricultural produce by *forobaforo* workers

was a healthy alternative to their migrating to the city or a distant region to sell their labour. Indeed empirical data on rural out-migration from three Malian regions supports this finding (Mazur 1984).

To some elder men, the authority of the *fa* 'patriarch', closely tied to the ability to reproduce the lineage and to grow agricultural produce sufficient to meet the daily needs of *du* members, appears threatened by market gardening. In this view, the *fa* position may be defined strictly in relation to the status of the *forobaforo* over which the *dutigi* (*fa*) has direct control of crop production and reliance on group continuity.

The intensified production of vegetables and fruits in market gardens has occurred outside the *forobaforo* where individual household members have capitalised on the growing market for tomatoes, chili peppers, and other crops. It could be seen as a threat to the corporateness of the group working the household field if individual oriented production were replacing lineage oriented production. Such a change would threaten the role of the *dutigi* and indeed the patriarch-centred society. The growth of individual values accompanying increased involvement in the national economy through commodity production has heightened the conflicts internalised in village and household structures.

In contrast but not necessarily antagonistic to this view of conflicting household field and individual garden objectives, I have shown the existence of significant complementary aspects of dryland subsistence farming and market

gardening. The two forms intensify land use, each with distinct agronomic needs and objectives. Similarly, labour time allocation can be adjusted to support the two systems. The position of the household head might indeed be reinforced, though significantly transformed by an increased distribution of wealth and power, by the access to personal income of his wives and younger male relatives. Historical social and household roles might determine who can best secure a niche in an increasingly competitive, market oriented economy.

One could posit the *fa* managing the constituent parts of the corporate group, gainfully employed in their respective personal activities as a reinforcement of group solidarity rather than a threat. This less *dirigiste* approach to farm management may best describe the actual approaches taken by some of the more successful Soro household heads (IV, VII, IX, XIV), confident that family members will be more content to stay and reproduce the lineage if they have the maximum access to personal gain while at the same time cooperating as a single work group to meet their daily food needs.

iv. Women farmers, gender, and commodity production.

The role of women in commodity production has been hidden in this chapter's discussion of household farm management by the narrow focus on the role of (currently) male-dominated market gardening as a form of commodity production in the study village. Like the patriarchs and market gar-

deners, women have a stake in large households. More wives usually implies a sharing of the domestic tasks. More female children eases married women's work in the areas of food preparation, fuelwood collection, water procurement, and clothes washing. More male children usually means more *forobaforo* workers, and if specifically sons, workers for a woman's field. Market gardens *per se* today benefit women's sons more directly than women themselves.

In theory, women's fields could become specialised in commodity production, but have not because of three principal production constraints. First, time, as shown with respect to fuelwood production, is a major constraint. Women's domestic responsibilities occupy most of their time. Second, women lack the means to transport fresh produce to markets. For this reason, non-perishable crops such as groundnuts, dried okra, and rice are more appropriate to women's production capacities. Third, as discussed in Chapter V, women's production is constrained by their limited access to farm labour.

Fuelwood production represents a form of commodity production parallel to the market gardening development. Fuelwood is, however, dominated by women and market gardening by men. That men and women have engaged themselves in two distinct forms of commodity production, producing their respective commodities in recognised separate spatial zones of the village locality is rooted in the historical social roles of men and women in Bamana society. Women woodcutters, like their male gardener counterparts, harvest local goods to

earn cash to meet expenses otherwise only met by entering the labour market. They produce goods on ancestral land that support classes that would, if the women woodcutters or market gardening men migrated, buy their labour. It is an exploitative relationship, where peasant fuelwood and garden crop producers are dominated in the marketplace by intermediaries--transporters, traders, buyers.

Both enterprises have potentially disastrous ecological consequences. Capitalising on a market for locally abundant goods, gardeners and woodcutters produce on a scale not hitherto known for either groups of products. Soro women are seizing the opportunity to earn cash. At the same time, though, no natural check appears to protect the landscape from denudation. Lands west of Soro on the periphery of Bamako have already been stripped of savanna trees. Gardeners eager to invest in mechanised ploughs and pumps, while crowding the high watertable lands may create a land shortage. That in turn could induce overcultivation and erosion.

Work responsibilities and cash-earning opportunities based on gender and age divisions have fostered a broad pattern of production with a spatial element: 1) male household heads with dryland household fields on lowland, loamy-clayey soils (*fala*), 2) younger brothers and sons with market gardens in the streambeds (*kò kònò*), and 3) women producing fuelwood and shea butter from resources in the bush (*kungo*). Each element--field, garden, bush--is interdependent. The household fields require the labour

time of active household members, but they also feed them, allowing them to make the most of their personal plots or fuelwood production. The market gardens, like the forest trees cut into commercial fuelwood, have become natural resource-based sources of personal revenue for members of household labour groups.

v. Summary of market gardening as intensified production.

The advent of dry season production has opened a period of the year to agricultural production previously under-utilised. High watertable land has become so highly valued that all such village lands have been brought into production during the cold season (*fonènè*) and hot season (*tilema*). Farmers without access to suitable land have entered into seasonal land borrowing arrangements with peasants in neighbouring villages. This change in the yearly distribution of work and village location of work is complemented by intensified growing methods and experimentation. Intensified market gardening production has resulted from the opportunity to earn cash from increased production of commodities.

In Soro, the most profitable commodities are fruits and vegetables that can be grown on land with relatively narrow ecological boundaries and is not in competition with dryland farming land. Labour, though, is more constrained than land, so any re-organisation of scarce labour resources is crucial to understanding changes in local agro-ecological relationships as well as in the domestic economy. From this

study of a single village, it appears that there is considerable scope for reorganising work-time to create income earning opportunities where there is a market for commodities. Because of the characteristic intensified nature of market gardening, comparative study in a region where non-market garden crops were the chief commodities might lead to different conclusions.

Conclusion.

Around the time of Malian independence, Jean Gallais (1960:153-5) commented that individualism was tearing apart village and household structures. The data from Soro show that no matter how much involvement in the commercial sector has increased--impossible to measure without precise, local historical production data--or communal/individual values have been altered, any breakdown of the authority of the chief (*dugutigi*) and patriarchical household head (*fa*) into 'individualism' has been tempered by the complexity of peasant agricultural production objectives. Without Soro's proximity to the Bamako market and the Baginda centre of agricultural introductions, Soro's involvement in commodity production would not have taken the same path. Indeed, Soro peasants might be more receptive to the current state-initiated commercialised agricultural programme if they could not profit from market gardening directed at urban markets.

The manner in which market gardening is integrated with household grain production in Soro is an innovation in farm-

ing organisation from which certain observations bearing upon peasant agriculture elsewhere may be noted:

1) Unit of Production. The patriarch-centred household labour group need not disintegrate into separate, smaller units when labour subdivisions of the household have access to productive land and markets for agricultural produce. Indeed, successful household subdivisions may reinforce communal household field (*forobaforo*) production in a reciprocal arrangement: labour subdivisions, which may include individuals, benefit from the communal subsistence production, while the returns to individual labour on personal fields satisfy at least some of the needs that if unmet might otherwise lead individuals to leave the compound.

2) Intensification. Market gardening may be especially suited to integration into the extensive, dryland household farming because it requires an intensification of production both in terms of time--year-round, and space--small parcels with high returns. New methods plus investment in production have intensified production so that market gardening does not compete for land or labour with household field production. Increased pressure on land could alter this apparent complementarity as population growth leads to more cleared land for fields, continued commercial fuelwood harvest, and crowding on market gardening land in high watertable areas. Technical changes in farming--increased tractor- or oxen-drawn ploughing--could further extend the cleared field area especially if soil improvement does not lead to increased yields per unit area. If capital invest-

ment in production from either the state or local peasants led to improved living conditions, the value of land would rise such that the existing management of natural resources and allocation of land would likely be transformed radically to sustain increased production.

In the quotation at the beginning of this chapter, the Soro chief expresses a view of the relationship between market gardening and household grain farming which emphasises the opposing crop priorities of different social strata. In this view, one commonly heard from heads of households, the young men are seen as concentrating their production efforts on the mangoes and tomatoes of their personal market gardens to the neglect of the household grain fields. 'In the past...', it was frequently heard, household fields were bigger and the young people worked in them throughout the daylight hours.

The market gardeners did not contest this view even privately, but situated the need to grow vegetables for cash in balance with household grain farming. The household field produce is not sufficient to meet all individual needs; but only after assuring a stable food supply, as through working on one's household field, can one reap the benefits of market gardening. The differing emphasis in the analysis of these two facets of contemporary farming are symptomatic of the changing role of agriculture at the village level.

Chapter IX.

Conclusion.

The Bamana farming system in Soro demonstrates complementarity at many levels, in terms of human activity and production in micro-ecological zones. At the same time, conflict is inherent within the system and increased by state intervention. This conclusion synthesises the findings of the chapters in relation to the conflict and complementarity themes, and special reference is made to the constraints on production. The three areas of the farming systems investigated--field types, agro-ecological relationships, and subsistence-commodity production balance--yielded answers to some questions, and at the same time suggested new areas that require further study. Questions are raised regarding measures to improve the system, policy decisions, and further research. The nature of human-land relationships is not so simple that a single conclusion can be reached. The following concluding sections correspond to chapters, beginning with Chapter III.

1. Balance in Spatial Organisation.

Chapter III focused on farmers' adaptation to the place where they live and produce crops, and on the balances of social divisions developed through time and evident in settlement patterns and spatial organisation. The balance of opposites played a role at the level of village spatial organisation and compound structure.

The moral economy, with the subsistence ethic, had the effect of reducing differences to minimise conflict. This phenomenon is most developed in the older villages described by Lewis (1979). These villages, like Soro, tend to have a concentric circle spatial organisation of production, centred on the residential area. This pattern reflects the inward-looking, subsistence-oriented direction of village production activity. The break in the model is made by market gardeners who need to have access to land resources capable of meeting the specific agro-ecological requirements of certain crops for which a market demand exists. The major exception to the concentric circle model in the case of Soro is not so surprising in this context.

This exception to the model fits the description of the 'newer' villages described by Lewis (1979). These newer villages were more market-oriented and had a marked individual production pattern as opposed to large subsistence households. The moral economy had less influence on production in this type of village with a market aim. Soro does not 'fit' neatly into the old-new, or moral economy-market economy dichotomies. Soro farmers are seeking to meet their production goals--which include a balance of both subsistence and market--by exploiting the resources they control. Farmers maintain that balance while constantly adapting to changing agricultural conditions.

Despite the emphasis given to production in this thesis, spatial organisation is not dictated solely by production goals. Within the village, 'village', 'field',

and 'bush' represent divisions of space the meanings of which invoke opposing elements: bush/chaos - village/order, physical-metaphysical, visible-invisible, safety-danger, with the fields a frontier area. Special practices mediate these contrasts to achieve a balance of opposites, and these have an impact on the human-land relations in the realm of attitudes toward nature. For example, the tree that is the residence of the protective spirits of the village (*dasiri*) is never cut and has special meaning to the chief who is the eldest male direct descendant of the village founders.

In addition to patterns of spatial organisation at the village level, the independent rooms and clustering of residential sub-units within a house (compound) reflect the delicate balance of interests within the household group. Each married man and married woman has a separate room (building of his or her own) within the compound. The room of a married man and those of his wives cluster around a courtyard within the larger compound of the entire residential unit under a single head of household. These separate units--men/women, families of married men--have a degree of independence within the larger groups of which they are a part. Their house forms thus reflect the balancing of their separate but interdependent lives which have corresponding features in the farming production system.

2. Conflict between State and Peasantry.

Contrasting these contemporary balances achieved by a distribution of subsistence and commodity production at the

village level, at the level of state-peasantry relations no such balance has developed. Despite the concentric circle pattern and inwardness of subsistence production, Malian peasant farmers have long had political and economic relations beyond the limits of their own villages. Markets, regional polities (*kafow*), and states have all linked farmers with broader social organisations.

Taking the case of the state-peasantry relationship, which is very old in the upper Niger basin, farmers perceive conflict in the form of state predation (Ch. IV). During the era of the Segu Bamana state in the eighteenth and early nineteenth centuries, taxes and slaves were taken from villagers. Under the French in the twentieth century where the historical background is more clear, the state intervened in the peasant economy to take not only surplus production in the form of taxes payable by the cultivation of cash crops (especially groundnuts in Soro), but also forced farmers to participate in public works projects and to serve in the colonial military forces. As the colonial state extracted surplus production and labour, its policies were inconsistent with the subsistence ethic. Conflict in the form of predation thus is long-established in the state-peasantry relationship.

Two models of state intervention developed during the colonial era. One involved the grafting of cash crops and forced labour on to the existing farming systems to meet the needs of the state. The other aimed to develop new kinds of farming organisations to grow new crops using new methods.

The aims of the latter model were much more oriented toward increasing yields and creating farmers dependent on marketing their crops, so that the colonial state could benefit from the increased market involvement of peasants. The two models survive today, albeit transformed.

These twentieth century models were developed to fulfil the needs of French imperialism: developing markets for French goods and supplying French industry with cheap raw materials. Since independence, Malian governments have sought to develop exports to the world market, especially cotton, and its rural development programme supports farmers who produce crops for export. As a continuation of the history of predation and state leaders dictating to the peasants what and how to produce, the state maintains a relationship with the peasantry characterised by conflicting interests.

3. Contradictions in the Access to Land and Labour.

Historically, the state has tried to gain an entry into the inward-looking farming system in order to stimulate and tap surplus agricultural production. However, the intricacy and flexibility of the farming system have made the successful implementation of rural development policies difficult to achieve. As emphasised in Chapter I in the discussion of the concepts of the household, access to land and labour have been two important aspects of the organisation of production that have been misunderstood. The conflicting and complementing relations through which farmers gain access to

these crucial means of production highlight some of the internal contradictions of the Bamana farming system, and its production constraints.

In Chapter V, the role of chief (*dugutigi*) in the village level allocation of land was emphasised. Through the chief, household heads gain access to land. The chief oversees the communal lands of the village and is responsible for representing the village in relations with outsiders. Through the office of chief, Soro is currently helping to avert conflicts with neighbouring villages over land use. Soro allows farmers from elsewhere to work on 'its' land. However, 'Soro's land' is not clearly defined by surveyed boundaries, so the authority of the chief over the land is always tenuous and open to negotiation. Furthermore, all land in Mali ultimately belongs to the state.

The situation in Soro raises the question of the role of hereditary chiefs in land management. What will happen to the land use patterns if the population of Soro and around Soro continues to grow? Certainly fallows will be reduced, the forests cut, and the wild animals driven away. The hereditary pattern of authority over village land does not foster a regional approach to land management. This responsibility currently lies with the state's Water and Forests Department, but in the eyes of the peasants its agents do not represent peasant interests and are part of the predatory state structure. The *de facto* access to the land is thus through the hereditary village chief overseeing a vast area with many land types and pressures, while *de*

jure control lies with an unrepresentative state agency.

Since independence, the state has tended to focus its relations with the peasantry on agricultural production. Both the first government under Modibo Keïta (1960-68) and the current government under Moussa Traoré (1968-present) have aimed their rural development programmes at the village level. This focus, while necessary, has tended to neglect the household and sub-household levels where production is organised.

As noted, access to land at the household level is obtained through one's affiliation with a lineage. The Bamana farming system has developed into a federation of field types each worked on by different groups and under the control of an individual member of the household. While the temptation to label this system of fields as 'complementary' is compelling when the detailed time-space movements between fields by household members is considered, this view ignores the existing tension within the system between members of the household of <u>unequal</u> status.

Household heads have the greatest access to labour of any household member. With the limited inputs for increasing yields available to most Bamana farmers, increased output is obtained through a greater number of workers cultivating a larger area. Like the village chief, the position of household head is hereditary, so only the eldest male can be the head of a household.

Although the household head has the greatest access to labour, within households different workers produce crops by

combining and integrating their tasks. However, the constituent members of the household work group can not control their access to land and labour without regard to the inequality between men and women, married and unmarried, head of household and non-head of household. As a result, under current practices tensions between household members are built into the household group structure.

The household head takes the perspective that the federation of field types is complementary. He potentially benefits most from this arrangement. From other positions in the household, tensions are more clear and the potential for conflict leading to a split in work groups is always possible. The institutions of both patriarchal village chief and hereditary head of household in regulating access to land and labour thus embody fundamental contradictions in the Bamana farming system.

4. Land Use Continuum.

The different farmer groups, i.e. those empowered with different access to land and labour, utilise different natural resources of the village land and in neighbouring villages. As with access to land and labour, land use in Soro is characterised by farmers' complementary exploitation of diverse micro-ecological zones which is subsumed within the unequal power of those different groups. Focusing on land use in the bush, Chapter VI emphasised the role of natural resources used by farmers for the cultivation of crops and for other activities that support the principal

farming activities.

Distinct from the three land concepts presented in Chapter III, a land use continuum existed in Soro between the three sectors of bush, field, and garden. This continuum emphasises the complementarity of function between the different micro-ecological zones. At present, the productive activities in each spatial sector do not interfere with those in the other two sectors. Considering farmers' limited means of controlling factors of production such as rain and soil fertility, this integrated use of different zones is remarkable. A bush 'subsidy' to farming thus exists.

The bush is collective land, under the chief rather than heads of households, so access is open to all villagers. Some of the trees of the forested sections of the bush are a valuable resource to women in the village. Women supply their kitchens with wood as fuel. They are also harvesting wood to sell to merchants who come from Bamako. This commodity production has developed because of Soro's proximity to a large market for fuelwood, its considerable wood resource, and its labour to exploit this resource during the dry season. Because of women's constraints on expanding agricultural production due in part to the heavy demands on their time for food preparation and domestic tasks, they have been successful in capitalising on the urban fuelwood demand.

The complementarity of land use functions masks the inequality behind the dispersal of groups of farmers to dis-

tinct micro-ecological zones. A striking pattern has developed of three types of production in three zones by three groups: the women's fuelwood production in the bush, the men's market gardening in the streambeds, and the household heads' dryland grain and pulse production in the lowland, fertile soils. The production constraints of the farming groups outlined in Chapter V imposed by performing time-consuming tasks for other groups and the limited authority to mobilise labour relegate the least powerful groups to the least valuable resource regions. Household heads thus control subsistence; married men combine cash-earning market gardening with subsistence production; and women exploit the forest niche in response to a market demand to enable them to earn cash independently of their husbands.

5. Integrating Agronomic Methods.

The centrepiece of the Bamana farming system, the cultivation of dryland grains and pulses, is itself characterised by different levels of complementary agronomic measures integrating activities, producers, and goals. As shown in Chapter VII, farmers have adopted a wide variety of practices to improve production with minimal purchased inputs. These practices integrate the efforts of limited labour and technical inputs to produce harvests aimed primarily at feeding the household members during the year. Significant differences in the practices of farmers, though, suggest that distinct categories of farmers may face separ-

ate constraints on production and that some of the tensions between different farmers may affect the methods employed.

All farmers faced some kind of a labour bottleneck, and their responses to this situation have resulted in a wide variety of tactics. Labour exchanges, plough and other equipment exchanges, non-lineage hired labour, and the farm labour group (*tònci*) were all used as part of farmers' attempts in 1987 to overcome production constraints. An example of a practice that developed into a pattern of farmers by category was the use of a tractor to plough fields.

Farmers with cash and limited access to labour were in a position to consider hiring a tractor. Data on access to labour showed that most women field heads in Soro could not recruit the numbers of workers that a married man could. With this limited access to labour, women were faced with scaling their fields to an area that they could manage alone. In 1987, the year of the study, women field heads--as well as household heads and heads of men's personal fields--began experimenting with a new input: hiring a tractor to plough their fields. Some women thus used cash earned from the fuelwood sales to invest in expanding their field area. They were experimenting in the integration of fuelwood production during the dry season with expanded dryland field cultivation during the wet season.

Women and men with relatively limited access to labour were also distinguished by the prevalence of intercropping millet, sorghum, and cowpea in their fields as compared with household fields where over 6 ha of these crops were grown.

The smaller growers tended to intercrop all three crops, while the large growers tended to sow millet and sorghum in separate parcels. While more data on the link between intercropping and labour would clarify the reasons for this difference, the collected data suggest that the practice of intercropping is not solely for agro-ecological reasons. Crop associations are common in the market gardens as well as the dryland fields of Soro. Farmers emphasise the complementarity of plants that can be grown together to save on labour inputs, rather than the nutrient sharing or other agro-ecological reason, although the latter is obviously a factor in determining their potential for simultaneous cultivation.

The differences between soil tilling practices also raise questions about the relationship between the agro-ecological and labour-saving functions of specific farming methods. As the evidence in Chapter VII shows, both mounding and oxen-ploughing are practised in Soro on the fields of large and small households. Many field heads without access to a plough and oxen had no choice other than hoeing, mounding, ridging, or hiring a tractor. On the other hand, some households with a plough and oxen chose to mound. As I have shown in Chapter VII, both agro-ecological reasons of soil conservation and amelioration, as well as the tensions within household labour groups play a role in the decision to mound or plough.

The question of the 'best' tilling method requires further investigation. Like intercropping, tilling practices

could be studied in a broader sample by an interdisciplinary farming systems research team that included a soils specialist, agronomist, and social scientist to determine the agro-ecological factors and labour-social factors involved in tilling decisions. Longer-term research that would involve trials at stations as well as concentrated research on selected farms could determine the difference in yields between millet, sorghum, and cowpea grown in mounded and ploughed fields. Such tests would need to investigate, among other things, the roles of soil organic matter, compaction, and water retention. The question of potential continuous, annual cropping on a mounded field was also raised in the case of Household IX. Is there any validity to the assertion that a mounded field system preserves the soil over the long-term?

Such research, especially the first suggestion of a team investigating both agro-ecological and social factors, might raise the question of the goal of agricultural production. At the level of the farm and from the perspectives of various members of the households--household heads, non-household head married men, married women, single women, and single men--the answers would likely conflict since the access to land and labour is so different. A twin-poled production aim in the Bamana farming system of producing crops and descendants has been proposed (Lewis 1979). In Soro, this dual orientation is evident at the household level. But, as I have shown, other farmers in the system have production goals besides the household heads. Although

labour is a production constraint for nearly all farmers within the Bamana farming system, different categories of farmers currently face separate constraints.

6. Breaking Dependence.

Chapter VIII concentrated on the high water-table, streambed, cash crop, market gardening activities dominated by male farmers. Extending village production areas to 13 km to the south inside a neighbouring village's land, ambitious dry season farmers turn the concentric circle model of intensive farming upside-down. Like the women fuelwood producers, they are demonstrating their ability to manipulate their own time and space constraints to capitalise on a natural resource that they can transform into fruit and vegetables with a ready market. This market gardening form of commodity production complements dryland farming in terms of time and space utilisation, but creates potential new tensions within the farming system.

Market gardeners are breaking down two forms of dependence that plague Bamana farmers: dependence on rain to water crops and dependence on the patriarch to provide for the material needs of household members. By exploiting those micro-ecological niches with a high water-table, market gardeners can dig a well and decrease their dependence on rain to the extent that they can farm during the hottest and driest months (March-May) of the year. Their gardens often displayed a wide diversity of crops within a small area, any of which could be more extensively cul-

tivated if access to a market existed. Tomatoes are currently the most popular garden crop because of their market in Bamako.

The cash income that individual farmers earn from tomato and other crop sales helps them to increase their independence from their households. They earn money that could pay for travel expenses to migrate to a wage-earning job, to buy personal belongings, or to pay for marriage expenses. This financial independence threatens the role of the head of the household in controlling household labour to maintain a household field labour group. Why, then, does Soro have relatively large households?

Large household labour groups appear to benefit from an economy of scale. A large labour group secures the food requirements for the household in a relatively limited period of time, freeing more time for household sub-groups to produce on personal fields. In this way, market gardening complements dryland grain and pulse cultivation in terms of 1) the field type (*nakò*) worked by a distinct social group, 2) the agro-ecological conditions of farming (lowland, rainfed versus streambed, well-watered), and 3) meeting the subsistence needs of households and the cash needs of individual men. As noted above, women exploit the forest, a less profitable, but accessible, micro-ecological zone to contribute to their cash needs.

Conclusion: The political impasse.

The farming system in Soro has developed in such a way

that numerous potential collaborative projects between farmers and merchants, tool producers, transporters, industrialists, and other groups can be imagined. Improved transportation, storage, packaging, and preservation of harvested grains, fruits, and vegetables coupled with the development of national and West Africa-wide markets could improve the demand and prices for farm products. From where would the direction and capital for such a change come? The state is not only without financial power, but is politically isolated from the farmers.

The significance of some of the findings of this study, such as the relationship between the spatial organisation of production and social organisation, have been recognised by the state in Mali. Under the first independent government, a village collective field programme sought to bring households together at the village level to produce crops for the benefit of the village community. Currently, efforts to revive village level production for village interests and to transform the *tòn* into an association of village farmers are part of the national rural development agenda.

The rural development programmes, which in 1987 were having no direct impact on Soro, contain some ideas that hold potential. The *tòn villageois* concept attempts, at least theoretically, to confront the labour constraints faced by farmers. If administered in such a way that farmers play a role in determining the crops they grow, then it will help farmers. The most likely beneficiaries are the household heads, especially of large farms with ploughs and

other equipment. The *tòn villageois* ideal does not address the multiple centres of production within the Bamana farming system.

In addition, the rural development programmes (ODRs) implementing the *tòn villageois* approach are distrusted. For the state to make effective interventions in the rural areas, the ODRs must be democratised to give farmers a voice. Farmers must have a decision-making role in determining which crops are grown and which markets developed. Just as Koenig (1986:125) found with reference to groundnut growing households and individual farmers in Kita, '...agricultural research institutions will need to work with the farmers' because 'Solutions...will only be found by collaboration of farmers and research institutions in the field.' The close adaptation to the local environment of Soro farmers demonstrates that they know the local conditions and therefore they have valuable knowledge to help determine the development of its productive resources.

Agricultural research and extension must be structured such that farmers can <u>initiate</u> the orientation of research. I have shown how farmers have an intimate knowledge of the local social and agro-ecological components of farming. This knowledge can not be dismissed by extension programmes if national agricultural production is to grow in the interests of farmers as well as non-farmers and the national budget. Current collaborative efforts involving the rural development programmes (ODRs) and the national agricultural research centre (IER) suggest that despite efforts to be '*à*

l'écoute du paysan' the final determinant for state interest in research is cotton, the most important agricultural export (cf. Verbeek 1987, OHV 1987, IER 1986).

In ODR programmes, farmers are stratified by cultivation techniques, including whether or not they plough and use fertiliser, and model farmers (*paysans pilotes*) are selected for access to credit based on their adoption of these techniques (Hinderink and Sterkenberg 1987). No allowance is made for views such as that of the head of Household IX who questioned and even opposed ploughing. Extension and research efforts under the ODRs are designed solely with the intention of benefiting the state commodity company concerned (CMDT, Riz Mopti, OHV, etc.). In assuming that what is good for the ODR must be good for farmers, the state perpetuates the same paternalistic model of state extension services prevalent since the colonial era (Bingen 1985:69, 120). At present, farmers only participate in research as subjects and not as sources of knowledge and decision-makers determining with national planners the direction of agricultural development.

The lesson that should be heeded by the organisers of 'rural development' is that those who unite in productive activities must benefit. The state can and does intervene in peasant agricultural production. Its interests are defined by its composition. The peasantry is not represented. What peasants need is representation/participation to determine how to improve their conditions in general which include the production of crops and husbandry of land.

The political question of representation, if it were part of the public debate, could raise a number of questions about the conflicting interests within the peasantry.

Inequality within the peasantry dictates the nature of the conflicting interests. There is nascent social differentiation in the form of peasants who have accrued more capital than others, and who begin to have class interests different from others. Their separate interests have been fueled by state intervention to support *paysans pilotes*. This has been recognised and analysed elsewhere (Dembélé 1987, Gakou 1987, Traoré 1984). Other forms of inequality are more pervasive, and may be more deeply hidden by the ideology of groups in power.

The inequality between men and women, resulting in the domination of women by men, and the exploitation of young by old are two such forms of social inequality. One of the paradoxes of these inequalities is that they are well-known and acknowledged. The authority of elders and male domination are part of discourse in many contexts, surfacing in arguments, jokes, songs, stories, metaphors, and proverbs. The familiarity of the theme seems to reinforce the ability of older men with power to benefit from exploiting women and the young by characterising the status quo at once as the historical, normal, and best way of doing things.

The conflicting interests within the peasantry between men and women, juniors and seniors, large labour mobilisers and small, capital-rich and capital-poor suggest that a more representative form of political participation would require

a questioning of established relationships within society. Participation would have to be from the national level down to the sub-household level where women and juniors organise their own production units. Such a questioning of relationships is not going to happen tomorrow. Nothing, though, is permanent, as I have tried to show with relation to farmers adapting to land and labour conditions.

The state now intervenes to promote certain crops through the rural development projects (ODRs). Suppose it targetted women? or, the young? The household relations might change. Targetting groups such as women can be a most effective approach in development. The Centre for Women Rural Development Agents (CFAR) in Wèlèsèbugu which helped village women purchase a shea oil machine provides an excellent model of such state-peasantry cooperation and mutual benefit.

The current patriarch rationale for maintaining a large household might disintegrate if women and youth had more power. The advantages of a large grain and pulse growing labour force currently reaped by the head of the household would remain. The agro-ecological advantages of mounding, intercropping, recycling household organic matter, manuring fields and gardens, and other methods presently practised would also continue. Any intervention should, for these reasons, consider the interconnectedness of household labour interests and of land use patterns in the production process.

Appendix A. Interview Questions and Survey Sheets.

I. Dry Season Gardens.

This first series of formal data collection consisted of surveys of the dry season gardens. The surveys were conducted 12 April-1 May 1987 in the gardens around central Soro and Mamaribugu.

With the permission of the gardeners, I visited the fenced gardens to observe the gardening operation and to collect comparable data on the gardens. The checklist I used is reproduced below. Using a tape measure, my wife and I measured the perimeter of the gardens demarcated by the fence and plots within the fence.

Some of the crops I thought I might see, I did not see, e.g. onion, watermelon, lettuce, and orange. Some of them were out of season (e.g. watermelon) and the others the gardeners knew but were not growing at the time of the survey. On the other hand, I found several crops that were not on my original survey list (drawn up from crops mentioned in talks with gardeners before the survey) that were commonly found in gardens, e.g. baobab, *sunsun*, and mint.

DRY SEASON GARDEN SURVEY (12 Apr-1 May 1987)

nakòtigi 'gardener':

Informant: (if other than head of garden)

1. Area:
2. Units: (locations)
3. No. *du* 'household' workers: Non-*du* workers:

4. Crops

Type	No. Plants/Area (m^2)	Distance to Well	Other
tamati 'tomato'			
jaba 'onion'			
filèn 'calabash'			
je 'calabash'			
gan ntiiribaara 'okra'			
kònkòn 'cucumber'			
gan jan 'long okra'			
bananku 'cassava'			
nsèrè 'watermelon'			
hariko ver 'green bean'			
da kumu			
foronto 'chili pepper'			
melon			
shu 'cabbage'			
salati 'lettuce'			
sira 'tobacco'			
nkòyò 'aubergine'			
Other			

5. Trees

Type	No. Specimens/Area (m^2)	Observations
lenburu kumunin 'lemon'		
lenburuba 'orange'		
manje 'papaya'		
buyaki 'guava'		
mangoro 'mango'		
namasa 'banana'		
Other		

6. Intercropping:

7. Tools:

8. Soil type:

9. Fertiliser:

10. No. wells:

11. Distance to house:

II. Households.

These interviews were conducted 11-27 May 1987 at Soro. I wrote out the questions in French, English, and Bamana in early May and then checked the Bamana version with Cheick Oumar Mara. Mara only checked to make sure that what I was doing would make sense to farmers, leaving me to learn about the farming system (and Bamana language) on my own. Before beginning the interviews, I tested the questions with a group of four farmers and adapted the interview questions with regard to their comments.

Even with the pre-testing, there were some poorly phrased questions, due entirely to my own mistakes, and some which did not produce the kind of reaction I expected, but which in their missing the point, alerted me to other aspects of farming. I have faithfully recorded the questions that I asked. With hindsight, I understand why I received some very puzzled looks each time I asked Question 4. Instead of the present tense, I should have used the past. I also needed to specify that I was interested in continual cultivation on a plot of land and the fallowing cycle.

I began the interview with an opening statement to help introduce my interests. The questions were aimed at establishing background on all the households, their compositions and fields, their farming organisation, farming history, and farming plans for the coming season. The interviews were also to help farmers to better understand what I was trying to learn.

All interviews were conducted at the houses of the persons being interviewed. In most cases, the *dutigi* answered the questions, though often in consultation with other members of the household who were present. If the *dutigi* was not present, or unable to talk, I spoke with the wife (in two cases), mother (1), or nephew (1) of the *dutigi*.

The interviews consisted of the following questions:

PRE-FARMING SEASON HOUSEHOLD INTERVIEW (11-27 May 1987)

bi mògò dow bè baara kè foro dow kònò. du mògòw bèe bè forobaforo sènè kè don o don fo juma don ani mògò dow bè jònforo sènè kè don o don wula fè ani juma don. tinyè don wa?
Nowadays some people work in different fields. Is it true that all the people in the household work in the household field everyday except Fridays, while some persons farm a personal field every afternoon and Fridays?

1. *foro wèrèw bè yan wa?*
   Are there other fields here? [besides the *forobaforo* and *jònforo*]

2. *du mògòw bè forobaforo sènè donw jumèn na?*
   On what days do household members work in the household field?

3. *forobaforo yòrò bè fan jumèn? hektari joli don?*
   In which direction is the household field? How many hectares is it?

4. *san joli aw bè nin foro sènè?*
   How many years are you farming this field?

5. *i bè sènèfèn jumèn fòlò dan? sukuya jumèn? (n'o bòra yen i bè jumèn dan?)*
   Which crop will you sow first? Which variety?

6. *o ko fè i bè sènèfèn jumèn dan? tuma jumèn?*
   Later, which crops will you plant and when?

7. *ninanèn i bè i ka foro bonya wa? mun na?*
   This year will you enlarge your field? Why?

8. *jònni de bè du forobaforo sènè? mògò joli de bè du forobaforo sènè?*
   Who works in the household field? How many people work in the household field?

9. *i bè sòrò min kè i bè mun kè n'a ye?*
   If you get a good harvest, what will you do with it?

10. *du kònò jònforo bè jòn bolo? -- musokòròbaw? musow? dògòniw? denkèw?*
    Who in the household has a personal field? -- elder women? women? younger brothers? sons?

III. Field Survey Sheet.

From 9 June to 14 August 1987, my wife and I regularly visited all the fields in Soro to collect data on labour input and farming methods. Each day on the top of a survey sheet like the one reproduced below, I recorded the weather conditions when we got up in the morning and at mid-day.

FIELD SURVEY SHEET (9 June-14 August 1987)

Weather conditions: Date _____

a.m.

p.m.

forotigi	hour of day	workers (name or gender/age)	field time today	activity, crop/tilling

IV. Interview Questions on Fields.

Interviews of the heads of field units were conducted 1 July 1987 - 26 August 1987 at Soro. Questions were first drawn up in June 1987, and checked for language, context, order, appropriateness for research ends desired, with C.O. Mara, 24 June 1987. They were checked in Soro with 20-22 year old farmers Lansina Kulubali and Abdulaye Tarawele. Adjustments were made during the interviews depending on the particular circumstances of each interview.

Some questions were better stated in different ways in all cases, some in the case of certain individuals. Questions 8 and 9 (Interview Sheet 1--IS1) were for farmers over 50 years old who might remember the colonial era; questions 10 and 11 were intended for younger farmers who might remember pre-drought conditions. I was flexible about adhering to the questions, yet tried to cover them all with each farmer interviewed. The farmers selected were the heads of fields, including *forobaforo*, *jònforo*, and *nakò*. This was intended to provide access to those responsible for the various field units and therefore for agricultural production. Of those persons who do farmwork, women in general, and young (<40 years) women in particular are underrepresented in the interviews, as well as teenage men.

Usually, the interviews were not at an appointed time. I would find someone in her/his field as I walked for the survey or sought field owners by looking for them in their fields. This method naturally led me to those who spend a lot of time farming.[1] And, these were the people with whom

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1. Some of those with the least power and wealth were missed by the interview design which was oriented towards those with fields. Another approach might have systematically included persons from different social strata, and thereby picked up older women with no fields from small households (only two missed), as well as young married women working in *forobaforow* of large households and cultivating small *nakòw* but not market gardens or grain fields (about 25 missed).

I was most interested in speaking. Because the farmers of very small plots, especially women's okra gardens, spend little time gardening, I did not interview many of them.

Three interview sheets were used, one for each of these three general field types. I carried these sheets with me, folded into a spiral bound notebook as I daily visited fields for the labour survey. Interviews were conducted in a variety of circumstances, although I tried to do them when the farmer would be most comfortable talking about her/his field. Most were conducted with just the two of us present in the field of the farmer. The presence of others can influence answers for reasons of humility or pride depending on the individual, so I tried to talk to the farmer alone. Some people understood what I was doing better than others. Some interviews lasted over and hour, while others were under five minutes. Most interviews lasted between 15 and 30 minutes.

I tried to interview each farmer who had a field. I interviewed each *dutigi* responsible for a *forobaforo*, or his representative, and each man or woman in the village who had a grain field, which I designate *jònforo*. Most, but not all, tomato gardeners were interviewed. No special attempt was made to interview women keeping house *nakò* plots which were in all cases less than 25 m^2, and in many cases consisted of a few isolated mounds around a shea tree.

As with the first interviews, despite pre-testing, some questions did not express exactly what I had intended. In Question 13 (IS1), I had wanted to distinguish between *forobaforo* and *jònforo*, but that only worked in a few cases. The hypothethical 'giving' part of the question presented a problem (use of the Bamana verb *ka di* 'to give'), especially because it could have implied that I might be capable of doing the giving (though I never heard this directly). In Question 17, I tried to ask farmers about their livestock. Some could not understand why I was asking about livestock, often the most valuable capital held by a farmer, and avoided answering this difficult question.

Question 5 (IS2) did not bring the anticipated responses. Its implicit assumption that one might not want to return to work for one's seniors' household goes against values of maintaining the authority of the head of the household. Since I had pre-tested the questions with young farmers (my age mates) who were potential migrants and had no qualms about leaving the village, I was not prepared for the reaction of older farmers.

Question 6, IS2, needed clarification for several reasons: 1) Farmers thought it referred to the field in its present location and/or crop--the parcel--and therefore made reference to the rotation and fallow cycles. 2) Many, especially 45 year olds and older, did not remember how long they had had a field. 3) The way one acquires a field is often gradual. A 12-13 year old, sometimes even younger, may start planting a few trial crops in a small plot and steadily increase the size of his or her farm land. 4) For older women who had fields, I changed the question to how long had it been since they worked in the household field. This would sometimes determine how long it had been since they could devote the bulk of their farming efforts to their own field. 5) For most, their self-image is as a farmer and therefore as one who has always had a field. I was not always successful at conveying that I was interested in the length of their own personal field tenureship. Besides, answers to the question sometimes implied explaining household social relations which were not necessarily harmonious. If the relations were not so good, it would be incumbent on the interviewee to hold face for the household before an outsider (outsider to household, village, culture).

INTERVIEW SHEET 1: *forobaforo* 'Household field'.

1. *mògò joli bè aw ka du kònò?*
   How many people are in your household?

2. *baarakèla joli bè forobaforo la?*
   How many people work in the household field?

3. *u bèe ye aw baramògòw ye wa?*
   Are they all from your lineage?

4. *u bè sara wa? coko di?*
   Are they paid? How?

   ni òwò (a) *u bòra yòrò jumèn?*
   If yes, from where did they come?

   (b) *u nana tuma jumèn* (*san jumèn*)?
   When did they come (in what year)?

5. *aw ka du mògòw, dòw bè baara kè ka wari sòrò?*
   What are the cash earning activities in your household?

6. *aw ka mògòw joli bè taa tilema fè ka baara kè yòrò wèrèw?*
   How many members of your household migrate during the dry season to work elsewhere?

7. *aw ka mògòw joli tun bè bò ka sigi yòrò wèrè?*
   How many of your family members have left to live elsewhere?

8. *tubabutilèla foro ani sisan foro...*
   During the colonial era, was your household's field larger than its current field...

   (a) *jumèn yòrò tun ka bon?*
   in terms of area?

   (b) *jumèn nafa tun ka bon?*
   in terms of wealth generated?

9. *tubabutilèla sènèkèfènw jumèn tun bè aw bolo? baarakèla joli?*
   During the colonial era, what farming tools did you have? How many workers did you have?

10.-11. Same as 8.-9. except that *sani ja ka na* 'before the drought' replaces *tubabutilèla* 'the colonial era'.

12. *salon aw ye nyò joli sòrò? boro joli? segi joli? jiginè joli?*
Last year, how much millet did you produce? (in units of 100 kg sacks, baskets which hold approximately 30 kg, or granaries) This question was repeated for all crops found in *forobaforow*: millet, sorghum, cowpea, maize, fonio, groundnut, Voandzeia.

13. *ni cogow yèlèmara*: (a) *ka dugukolo nyuman di aw ma ani sènèkè minanw, sanji ka na kosèbè, barakèla b'aw bolo, aw bè foro bonya wa?* (b) *ni sòngò nyuman bè sòrò, aw bè foro bonya wa?* (c) *ni mobili ka nògò ani sira nyman bè sòrò, aw bè foro bonya wa?*
If things changed, and (a) you had good soil, farming equipment, and rain were plentiful, would you increase the size of your field? (b) If prices were better, would you increase the size of your field? (c) If transport and the roads were better, would you increase the size of your field?

14. *misidaba b'aw fè wa?*
Do you have a plough?

15. *wotoro b'aw fè wa?*
Do you have a donkey cart?

16. *faliw b'aw fè wa?*
Do you have donkeys?

17. *misiw b'aw fè wa? u bè min? (fonènè ani tilema) sagaw b'aw fè wa? baw b'a fè wa?*
Do you have cattle? Where are they (during the cold season and the hot season)? Do you have sheep? Do you have goats?

18. *aw delila ka maci walima misidaba singan wa?*
Have you ever borrowed/hired a tractor or oxen-drawn plough?

19. *e hakili la, mun de ka kan ka kè ka yèlèma dun sènè la ni nafa bè sòrò?*
What changes do you think need to take place so that farmers can prosper?

20. *yiriwali kòrò ye mun ye?*
What is the meaning of development?

INTERVIEW SHEET 2: *bolofèforo, jònforo, musokòròbaforo, cèkòròbaforo* 'Personal fields'.

1. Same as Interview Sheet (IS) 1, no. 2.

2. Same as IS 1, no. 3.

3. Same as IS 1, no. 4.

4. *i ye cikèla ye. ni cikè bana, e bè wari sòrò coko wèrè jumèn na?*
   Do you have any non-farm cash income?

5. *i tun bè taa ka baara kè yòrò wèrèw?* (Bamako, *dugu wèrè, Sènègali*)
   Have you ever gone elsewhere to work, e.g., Bamako, another village, Senegal?

   ni òwò, (a) *i tun bè mun kè?*
   If yes, (a) what did you do?

   (b) *i tun bè taa mun na?*
   Why did you go?

   (c) *i tun bè segin mun na?*
   Why did you return?

6. *i bè foro fè san joli?*
   How long have you had a field?

7. *i ka bolofèforo, a tun bè yèlèma cogo di?*
   How has your personal field changed?

8. Same as IS1 no. 12.

9. Same as IS1 no. 13.

10. Same as IS1 no. 14.

11. & 12. Same as IS1 no. 17.

13. Same as IS1 no. 18.

14. Same as IS1 no. 19.

15. Same as IS1 no. 20.

INTERVIEW SHEET 3: *nakò* 'Garden'.

1. Same as IS1 no. 2.

2. Same as IS1 no. 3.

3. Same as IS1 no. 4.

4. *i bè nakò sènè samiya? fonènè? tilema?*
   Do you garden during the wet season? the cold season? the hot season?

5. Same as IS2 no. 4.

6. Same as IS2 no. 5.

7. *n'i tè nakò sènè (ni nakò t'i fè), e bè wari sòrò coko wèrè jumèn na?*
   If you did not garden--or if you did not have a garden--how would you earn money?

8. *i bè nakò sènè san joli?*
   For how many years have you gardened?

9. Same as IS2 no. 7, but *nakò* instead of *bolofèforo*.

10. *salon i ye tamati joli sòrò? kèsi joli? kònkòn joli?* etc.
    What was your tomato harvest last year? in number of crates? What was your cucumber harvest?
    [*kèsi* changed to *kare* in practice]

11. *i bè nakò fènw feere yòrò jumèn?*
    Where do you sell your garden produce?

12. Same as IS1 no. 13.

13. *sènèkè minanw jumèn b'i fè wa?*
    What farming tools do you have?

14. *nègèso b'i fè wa?*
    Do you have a bicycle?

15. *kèsi b'i fè wa? joli?*
    Do you have a tomato crate? How many?

16. Same as IS1 no. 15.

17. Same as IS1 no. 18.

18. Same as IS1 no. 19.

19. Same as IS1 no. 20.

Appendix B. Bamana Natural Resources Terminology.

I. **Land.**

bila: Pond in bush (*kungo*) where wild animals drink; floodable area around pond, e.g. pond on way to Sakobugu by fence in lowland. *dala* is the Segu version of the word according to Soro residents.

còocòo: Light rain lasting for a long time; fine or misty rain without thunder. Antonym (in Soro): *sanbanana* 'heavy storm'.

fala: Lowland or *bas-fond*; large area which may temporarily flood locally during rainy season. Deep soils, of considerable variety from sandy loams to loamy clays.

faya: The name of a specific stream in the Soro area. Not the same as a *kò*. It is longer and deeper.

folon: Ditch, trench, smaller than *kò*.

foromanyan: Abandoned or fallow field.

fuga: Lateric area, degraded. Few trees, gravel, usually not cultivable. *belefuga* is considered unsuited to cultivation by farmers, because there is too much gravel. *fugagini*, on the other hand, is viewed favourably. It has no trees; the soil is reddish or black.

kènè: Few trees, some grass; open land. If soil type is *dugukolofin*, then grass is abundant. *walawala* has less grass than *kènè* and no trees.

kò: Stream or streambed, called *marigot* in French; garden. Intermittent stream at Soro.

kulu: Hill, mountain.

kulumayòrò: Hilly area, or side of hilly area; many trees, e.g. next to Kulujanjan.

kungo: Uncultivated land removed from village; forest, bush; wilderness, wildland. *kungojan* is a great forest removed from villages, e.g. in the region of the Faya, where there are many trees and animals, and no villages.

lè or *lèkènè*: Flat place without stones; lowland; arable. *bafala=lèkònò* according to one informant in Soro, which is a large lowland area usually beside a river; cows like it. Sakobugu soil described as *lè*.

nkakan: Clayey soil, red-brown in colour. Water runs off; difficult to farm.

nton: Termite mound, termitaria.

ŋunan: Place that has been burned.

sanmegera: Lightning.

tintin: Hillock, rise; e.g. between Soro and Sakobugu.

walawala: Natural clearing, very little grass, no trees; slight difference with *kènè* where there is some grass.

wula: Bush. Also, *wulè* or *kungoba* in Soro, towards and beyond the Faya, lots of animals, bigger than *kungo*.

II. Soils.

bèlèmandugukolo, bèlèdugukolo: *bèlè* means gravel and *dugukolo* means soil. These soils have lateritic gravel and are not highly valued for agriculture.

cèncènmadugukolo: *cèncèn* is sand, so *cèncènmadugukolo* is sandy soil which is not found at Soro. Farmers knew of it as a riverside soil found near the Joliba. Ruyssen (1957:148) refers to *'seno'*, sandy soil where fungus is especially common.

dinmugu, dimugu: Soil without rocks or gravel. It is easy to work.

dugufin, dugukolofin: *fin* is black or dark. These black soils are considered good for farming.

fala: Lowland soils. *fala* is more precisely a landform term than a soil term, but it is included here because of its prevalence at Soro and farmers' frequent reference to it concerning soil matters. Ruyssen (Ibid.) refers to *'danga'* as light soil, with some sand, red (*dangabilen*) or black (*dangafin*).

gini: Heavy soils with high clay content. Known for their water retention. Ruyssen (Ibid.) refers to *'dian'* as heavy, black soils, and *'dianpéré'* as heavy, very clayey soil, that cracks when dry.

nkakandugukolo, nkakan: A clayey soil. Little or no gravel; can be grassy; trees are present.

tomodugu: *tomo* is a settlement in ruins. This is the soil of a former hamlet or village site. The term was not used much in Soro where farmers preferred the landform term *tintin* to describe such sites which were frequently mounds. The term was used, however, in the village near Wèlèsèbugu.

walawalafin: Hard packed clay. *walawala* is a reference to the lack of vegetation cover.

III. **Plants.**

Notes on plants identified in the field or reported by Soro residents to be in the area. I have used a wide variety of sources to compile this glossary: Von Maydell 1986; Thoyer-Rozat 1981; Bailleul 1981; Dumestre 1981-7; Vickery and Vickery 1979; Heywood (ed.) 1978; Gledhill 1972; Purseglove 1972, 1968; Berhaut 1967; Pageard 1967; Busson 1965; Dalziel 1937; Aubréville 1932 ANM.

baganin: Physic nut (Jatropha curcas) Euphorbiaceae.
Found only as a living fence or hedgerow surrounding market garden or abandoned garden. Trimmed and cuttings planted during wet season to protect enclosed garden crops; a cultivated plant; poisonous (*baga* 'poison'); seeds used to make soap.

bakòrònpeku: (Lannea velutina?) Anacardiaceae.
Larger leaflets than *npekuba*, not as common at Soro, large tree.

balansan: (Acacia albida) Leguminosae, Mimosoideae.
Loses leaves at beginning of wet season and sprouts new foliage at beginning of dry season. Three mature specimens located on the western and southern edge of the village; this well documented Sahelian species is native further north and in the Segu area; no other specimens are in the area, suggesting that these were introduced, possibly further evidence to the Segu origins of the village founders related in the oral history of the founding Kulubali lineage of Soro.

balimbo: (Crossopteryx febrifuga) Rubiaceae.

baro, baru: (Nauclea latifolia) Rubiaceae.
On banks of streambed (*kò kònò*) in seasonally moist soil.

bolokurunin, tegekurunin: (Cussonia arborea) Araliaceae.

bònsòniŋòni: (Acacia macrostachya?) Leguminosae, Mimos.
Compare with *koroto* and *ŋonibadonkin*; longer leaf and shorter thorn than *koroto*. found in dry zones, lateritic, rocky (*fuga*).

bunbun: Kapok (Bombax costatum) Bombaceae.
Very rough bark, but not sharp, fruit hard shell of purplish colour, cottony inside, with seeds that blow in the wind. Large tree found in sacred grove (*kòmò tu*) and in bush. In cultivated or fallow soils. Elsewhere called *bumu*. Fuelwood.

cangèrè: (Combretum spp.) Combretaceae
cangèrèbilen: (C. glutinosum) Very common tree/shrub with large, thick leaves, young leaves have dusty secretion, flowers small yellow-green, fruit four-

winged, never with scales, early succesion shrub on fallow land.
cangèrèjè: (C. collinum geitonophyllum) Very common succession shrub in fallow fields. Shoots up in abandoned fields.

dakani, dagani: (Annona senegalensis) Annonaceae.
This is the *pomme cannelle*, of Central American origin, 4-6 m tree with edible fruit (Busson 1965:180); in Soro very common, flws hang down, 2 cm, yellowish, waxy; lvs blue-green; edible fruit.

dugumanpekunin, mankolokonfura: (Vitex spp.) Verbenaceae.
Two specimens (not common) along streambed south of Soro, shrub to 2 m, large leaf, blade to over 20 x 10.5 cm, elliptic to obovate, fleshy and moist like Philadendron, slightly pubescent; flower not seen when observed in mid-August; edible fruit, similar to grape but smaller, cluster of red berries, darkens to blackish, single seed.

dugura, dogora: (Cordyla pinnata) Leguminosae, Papil.
Common medium-large tree found in in drier, upland areas like the rise between central Soro and Sakobugu. The wood was frequently used by the carpenter in making planks for doors or door frames. The fruit, ripe in June at the beginning of the wet season, is collected by women and children, dried, boiled and added to sauces as a meat substitute. It looks like cooked meat when prepared. Also cited as an important food during lean years.

goro, goroŋèni: (Acacia polycantha campylacantha) Leg., Mim.
Fuelwood

gele: (Prosopis africana) Leguminosae, Mimosoideae.
Foliage like tamarind, but lighter; pods cylindrical, dark brown. Very hard wood, so good for pestles. Fuelwood.

jabi: Henna (Lawsonia inermis) Lythraceae.
Henna grows in areas near settlements. A domesticated plant not closely tended, but sometimes found in gardens. Used to dye hands, feet, and lips.

jala: Senegalese mahogany (Khaya senegalensis) Meliaceae.
One of the largest indigenous trees in the Soro area. It is common in the forested areas of *fala*, especially from the streambed southwest to Kulujanjan. Its wood is highly valued by woodworkers. The colonial administration used it as the principal street tree in Bamako, Segu, Niono and other towns where very tall specimens can be seen today. In Soro, *jala* wood can be seen in mortars (*kolonw*), stools (*kurunw*), and wherever hardwoods are necessary. It is favoured also for the making of charcoal to sell to Bamako charcoal mer-

chants. Flowers Feb- Mar, fruit is woody capsule mature Jan-May, flat-winged seeds, prefers deep soils.

jimijana: (Entada africana) Leguminosae, Mimosoideae. Small tree to 7 m, leaves bipinnate, alternate; flowers cream white or reddish yellow, slightly scented, spikes up to 15 cm long, 5 spatulate petals; pod 5-22 cm, flat, fragile red-brown outside, white inside, undulate margin, winged (2) seeds, fire sensitive (von Maydell 1986). In Soro, bi-pinnate, 1 cm leaflets. Called *samanèrè* in other areas. Fuelwood.

jurasokalanin: (Feretia apondanthera) Rubiaceae.

jun: (Mitragyna inermis) Rubiaceae. One large, old specimen in a field at Mamaribugu and several others along the streambed (*kò kònò*), attesting to their penchant for water. Not common and protected. Clayey soil.

kangòròn, kankòrò, kangòrò, nkangòrò: (Strychnos spp.) Loganiaceae. *kangòròba*: (S. spinosa) Hard shelled, yellow, edible fruit.
kangòrònin: (S. innocua).

kolokolo: (Afrormosia laxiflora) Leguminosae, Papil. Very hard wood good for tools and charcoal. Fuelwood. Dead specimen east of village in lateritic area (*fuga*).

koroba: (Vitex doniana) Verbenaceae. Large (15-20 m) tree in wooded areas (*fala* and *fuga*). Edible fruit. Leaves 5-foliolate.

korotoŋòni: (Acacia macrostachya?) Leguminosae, Mimos. Thorny acacia tree; finely bi-pinnate, shorter leaf than *bònsòniŋòni*; cream colour raceme; recurved thorn longer than that of *bònsòniŋòni*. Common in drier areas, especially lateritic (*fuga*). Also compare with *ŋonibadonkin*.

koroninŋènŋèn: (Vitex chrysocarpa) Verbenaceae. Leaves 3-foliolate. Moist areas, streambed (*kò kònò*).

koroninfin: (Vitex diversifolia) Verbenaceae. Small tree. Tri-palmate (undivided) leaf, hairy, colour of guava leaf. Edible fruit.

kònòninpeku: (Pseudospondias microcarpa). Anacardiaceae. Large tree, not as spreading as *npekubajè*. Edible fruit, not as sweet.

kungosiranin: (Sterculia setigera) Sterculiaceae. Found only on the rocky sides and tops of hills (*kuluw*).

-ladon: Suffix on tree names meaning parasitic on that

tree, e.g. *siladon*, a parasite of the shea tree. Also on *wòlò*, *npeku*, and *cangèrè* though not necessarily the same species.

misininkumbere: (Portulaca oleracea) Portulacaceae. Common purslane growing freely in gardens. Germinates and sprouts rapidly following first rains in May or June. Weeded out of fields and cooked in sauces.

mògòyiri: (Stereospermum kunthianum) Bignoniaceae. Flowers like empress tree.

nbure: (Gardenia spp.) Rubiaceae.
nburencè: (G. ternifolia).
nburenmuso: (G. erubescens). Both species of Gardenia are found in *fala* and *fuga*. The fruit of G. erubescens is eaten. Ripe during the wet season, it is considered an important food in lean years.

nèrè: (Parkia biglobosa) Leguminosae, Mimosoideae. Protected tree found in sacred grove and in lowland (*fala*) land. The dry interior of the seed pod, including seeds is the source of the important food *sunbala*. This yellow condiment is used to flavour sauces. The colour yellow in Bamana, *nèrèlaman* or *nèrèmugulama*, comes from the colour of the interior of the seed pod. Von Maydell (1986) says prefers deep loam and cultivated areas.

nfògòfògò: (Calotropis procera) Asclepiadaceae. Found in denuded areas, and an indicator of low fertility soil. Popularly known as the 'children's football' plant because the air filled sack-like fruit makes a miniature football.

ngalama, nkalama: (Anogeissus leiocarpus) Combretaceae. Deciduous tree. Flowers during wet season, yellow-green/creamy white, red calyx, globose heads; conelike fruit. Early succession shrub in fallow fields.

ngaro, karo, nkaro: (Cissus populnea) Ampelidaceae. Small tree or vine with white branches, bark peeled to use in fastening supports in roof frame and in tying bundles of firewood.

ngiliki, giliki: (Dichrostachys cinera) Leguminosae, Mimos. Common in dry, rocky (*fuga*) areas. Flowers Feb-June, resembles ballerina with pink tutu, valuable honey source. Invades fallows, root suckers, stong thorns up to 8 cm, grow out of branches, slightly recurved. Branchlets used in fencing where needles are desired.

ngobole, kolobe: (Combretum micranthum) Combretaceae. In Soro, large shrub with Combretum-type lantern seed pod. Leaves shining light green when young, typically rust-coloured when mature (dry season); small white

flowers. Common in areas of rocky soil (*fuga*) and indicator of poor soil. Often associated with Acacia machrostachya and Combretum nigricans (von Maydell 1986).

ngòna: (Sclerocarya birrea) Anacardiaceae.
Small deciduous tree. Flowers Jan-Apr before the leaves appear. Edible fruit in *fobonda*, fibrous pulp, like mango.

nògònògò: (Grewia spp.) Tiliaceae.
nògònògòbilen: (G. mollis?). Shrub. Flowers late June, numerous yellow stamens, five yellow petals, five yellow-green sepals; leaves alternate to 9 x 5 cm, pubescent, dentate, elm-like. Edible fruit *fobonda*. Found in *fuga* and *fala*, very common; many specimens on ridge between Sakobugu and Soro. Prominent lateral veins branching toward margin.
nògònògònin: (G. kerstingii?). Elliptic leaf 8.5 x 3.5 cm, prominent veins, hairless backside, flowers in clusters of 3, sepals dull yellow-orange, 5 yellow petals, numerous stamens, specimen SE of village near field of Household XVI, edible fruit *kawule*.

npalanpalan, nbalanbala: (Securinega virosa?) Euphorb.
Deciduous shrub; one of the last to leaf out in June. White berries in July like those of snowberry (Symphoricarpus). Lightweight branches used to stake tomatoes. Soro residents say that *njènè* is the Segu area name for the same plant.

npeku: (Lannea spp.) Anacardiaceae.
npekubajè, npeku, mpeku, bekubajè, binbè: (Lannea acida). Large deciduous tree. White bark. Flowering late May, while still leafless, pretty flower clusters. Sweet edible fruit, purple-black drupe in grape-like cluster. Found in gravelly soil (*belekolo*). Leaves crushed and boiled used as eyewash for eye irritations.

nsaban, nzaban: (Saba senegalensis) Apocynaceae.
Liana with jasmine-like fragrant white flowers. Edible fruit in June. Used to flavour *mòni*, sold in markets in season at low price. Common in *fuga* and *fala*.

nsègènèn: (Balanites aegyptica) Zygophyllaceae.
Fruit edible in *fobonda*. Long green needles. Bark of trunk and roots stripped, boiled, and used as a wash for joint and muscle ache.

nsèrè: Fig (Ficus spp.) Moraceae.
nsèrèbilen: F. glumosa. Large spreading evergreen; the *dugudasiri* at Soro.
nsèrèninjè, jatigifaayiri: F. iteophylla. Epiphytic, woody tree. May live on host, e.g. shea, until both are very mature.

nsira, sira: Baobab (Adansonia digitata) Bombcaceae. Very large tree, more common to north in drier region. Many specimens in village and in old village sites; commonly found in gardens. Leaves eaten in sauce, dried or fresh; bark used as fiber for tying wood; fruit edible.

nsòyen: (Leptadenia hastata) Asclepiadaceae. Herbaceous vine, very common.

ntama: (Detarium senegalensis?) Leguminosae, Caesal. Popular, edible fruit. Common in *fuga*. Shoots sprout in fallow fields, especially in burnt areas. *ntabakunba* in Wèlèsèbugu. Edible fruit ripe late February, sweet and dry. Women collect while getting firewood. Keleya market full of fruit to be sold to merchants headed to Bamako. Surplus leads to low prices and a mere pittance for peasant women who collect it in the bush when cutting fuelwood, while merchants capitalise on over-production and sell for profit in Bamako.

ntamaro: Date palm (Phoenix dactylifera) Palmae. Single specimen date palm inside courtyard of Soro house.

ntanbolo, ntamboloŋòni: (Zizyphus mauritania) Rhamnaceae. Edible fruit *fobonda-fonènè* (Oct-Jan), <1 cm, drupe, dries well, sweet apple flavour, one large stone; leaves have prominent veins on underside like ceanothus. Von Maydell (1986) notes large world distribution, plantations in California and Mediterranean.

ntiiribaara: (Cochlospermum tinctorium) Cochlospermaceae. Bright yellow five petal flower blooming March-May; flower stalk shoots up first, often beside termitaria (*nton*). Palmately cleft leaves follow during wet season; annual stems.

ntomi: Tamarind (Tamarindus indica) Leguminosae, Caesal. Large protected tree; associated with hunters (*donsow*). Seeds used to flavour (sour) *mòni*. Baginda bottling plant manufactures syrup flavoured with *ntomi*.

ntònkè: (Ximenia americana) Olacaceae. Common in *fuga* and *fala* areas. Edible drupe ripe mid-May to mid-June at the beginning of the wet season.

nyama: (Pilostigma sp.) Leguminosae, Caesalpinioideae. *nyamacè, nyamafitini*: (P. reticulatum). *nyamamuso, nyamaba*: (P. thonningii). Both species of *nyama* are very common scrubby bush, or if protected from firewood collectors, as in the sacred grove, it is a small tree. Early coloniser of fallow fields. Outer bark stripped to make *fu* 'fiber' for tying firewood clusters and construction frames. Long pods burnt to

smoke *nunuw* 'bee hives' to attract bees in to hive set in tree (Wèlèsèbugu). Found in cemetaries at both village near Wèlèsèbugu and as nearly pure stand at Soro. Said to be fire resistant. Flowers Dec-June, evergreen.

nzanŋènŋòni: (Acacia seyal?) Leguminosae, Mimosoideae.
Long needle acacia tree, finely bi-pinnate. Dry areas.

ŋanyaka: (Combretum molle) Combretaceae.
Blooming mid-June, reddish tinge to many leaves, fuzzy, prominent veins; stamens yellow, about 8. Lovely fragrance like gardenia. Common on Sakobugu rise (*fuga* and *fala*). Crushed leaves used as a baby wash, boiled leaves for stomach ache.

ŋònibadonkin, ŋuni, ŋunimadonti: (Acacia macrostachya?) Leguminosae, Mimosoideae.
Thorny acacia. Feathery bipinnate leaves. Pipe cleaner flower, cream color. Drier areas, especially *fuga*. Compare with *bònsòniŋoni* and *koroto*.

sagan: (Bridelia ferruginea) Euphorbiaceae.
Shrub. Bark stripped to tie wood bundles.

samanogolan, nogolanba: (Ceratotheca sesamoides) Pedaliac.
Herbaceous, looks like foxglove. Closely related to sesame, sometimes cultivated for leaves and seeds. Leaves are used in sauce for *to*. One Soro informant said that two varieties exist, and that this is the big one hence the *sama* 'elephant' and *ba* 'big'. *anogo* or *nanogo* in Busson (1965).

sana, sanan: (Daniellia oliveri) Leguminosae, Caesal.
Tree in which bee hives placed Wèlèsèbugu. Fuelwood in Soro.

seretoro: (Ficus capensis) Moraceae.
Fruit on trunk in clusters (late April); considered inedible (cf. von Maydell 1986). Smaller than *sutoro* fruit. Found in lowland (*fala*).

sèbè: (Borassus aethiopum) Palmae.
In gardens and around villages. Hutchinson and Dalziel (1937) note that a palm wine can be made from this species, that is 'the best kind and the richest in sugar'.

shyò: (Isoberlinia spp.) Leguminosae, Caesalpinioideae.
Wood used in construction.

si: Shea (Butryospermum parkii) Sapotaceae.
Common and economically important tree, discussed in Ch. VI. Flowers Feb- Mar, fruits July-Aug. Heavy fruiting appears to be linked to rainfall of preceding year, but not cyclical (Ruyssen 1957). Edible fruit. Principal vegetable oil in diet from processed seed.

Hard wood made into charcoal. Mentioned by Ibn Battuta (1966:45) in the fourteenth century as sweet fruit, and as source of oil for cooking, frying, skin lotion, fuel for lamps, and plastering houses. Busson (1965) claims it can live to 300 years, giving maximum fruit at 50-100 years. Ruyssen (op. cit.) notes that it will not tolerate flooding, and likes loamy-clayey soils. Commonly in cultivated areas. 3 varieties recognised (Ruyessen op. cit.): 1) *boorodon* 'plentiful' (also called *si joona* 'early shea' or *sini* 'little shea')--bowl-shaped tree, main branches upright, crown compact, regular, and spherical, bark medium deep fissures, long, narrow, light-coloured leaves, small fruit with thin, dull or astringent tasting pulp, nutshell is thin and light-coloured, fruits fall easily with wind, seeds less rich in oil; 2) *booro booro* 'very plentiful' (also called *siba* 'big shea' or *si kòsa* 'late shea')--broom or parasol shaped, main branches upright, few lower secondary branches or leaves, very bushy at the top, thin bark with superficial fissures, large and darker leaves (similar to mango leaves), latest variety, fruits fatter, with much sweet pulp, dark nutshell, heavy pro-ducer, richer in oil; 3) *kolofinman* 'dark nut'--intermediary shape, bowl-shaped, but more spreading than *boorodon*, main branches become closer to horizontal, bark thick and deeply fissured, less well-known by Ruyesson but varieties with the following correspondences noted: a) small leaf, upright branches, small fruit with sweet pulp, b) large leaf, spreading branches, big fruit, astringent pulp, c) late, dark nutshell, sweet pulp, d) early, light-coloured nutshell, astingent pulp.

sinjan: (Cassia sieberiana) Leguminosae, Caesalpinioideae. Common near Wèlèsèbugu and south, still common at Soro but less so. Bright yellow blossoms like wistaria in March-early April, and again possibly during the rainy season.

siri: (Burkea africana) Leguminosae, Caesalpinioideae. Specimen in *fuga*, also in drier *fala*.

sonsaninkankòyò: (Hackelochloa granularis?) Gramineae.

sonsanintamugu: (Merremia aegyptiaca) Convolvulaceae. Very fine powder of flower is put on burns to help heal. Specimen in termitaria (*nton*) area.

sunsun: (Diospyros mespiliformis) Ebenaceae. Evergreen tree. Edible fruit with smooth, green skin. Tastes like persimmon, astringent, makes teeth fuzzy, skin bitter. One black pit, 1 cm. Children eating a lot in February. Informant in Keleya said that *sunsun* was Malinke and that locally it was called *dana* or *dna*. Common in Soro gardens. Moist savanna species, loamy soils, watercourses (*kò kònò*).

surukuntombòlòn: (Ziziphus mucronata) Rhamnaceae. Thorny. Specimen in garden fence. Von Maydell (1986) says similar to Z. mauritiana, but no prominent vein in leaf.

sutoro, toro, ntoro: (Ficus gnaphalocarpa) Moraceae. Very large tree, to 20 m, milky sap. Flaking, sycamore-like bark. Edible fruit in *fobonda*. Outside of oval leaves have reddish veins. Slightly sticky leaves. Specimens in fields and cemetary west of Soro. Prefers nutrient-rich soils according to von Maydell (1986). Venerated in ancient Egypt, mentioned in the Bible (Ibid.).

tubabusunsun, tosunsun: (Annona squamosa) Annonaceae. Garden specimens. Edible, sweet, black fruit in *fobonda*.

tutu: (Parinari curatellifolia?) Rosaceae. Edible fruit. Deciduous. Leafing out and flowering in late May.

wòlò: (Terminalia spp.) Combretaceae. Deciduous tree. Long white flower spikes in late May-June, beetles on flowers. Big silver-white linear leaves. Glaucous seed pod, twisted. Common in fields and fallow fields (protected), *fuga*, and gravel (*belekolo*) east to Munzun. *wòlòjè, wòlòba*: (T. macroptera), smooth bark, big leaves (15-35 x 5-12 cm), [blackish fissured bark says von Maydell] lvs used to wrap shea butter for storage, transport, and sale, long flower cluster which attract bees and *nkòbò* (like bees); *wòlònènnèn, wòlòcèni*: (T. avicennioides) smooth bark, smaller tree than above, smaller leaves, and smaller fruit.

IV. **Amphibians, Reptiles, and Mammals.**

This partial list includes animals, or evidence of them, personally sighted in Soro in 1987, unless otherwise stated. The sources for this glossary include: Haltenorth and Diller 1980; Villiers 1975.

Amphibians and Reptiles

fònfònnin: (Causus rhombeatus) or (Causus maculatus). Poisonous. Seriously wounded resident of village near Wèlèsèbugu in Mar. 1987 and had killed Soro resident in 1986.

koro: Iguana.

nkana: Water lizard (Varanus niloticus).

ŋanjuru: Kind of snake.

mininyan: Seba python, royal python (Python sebae). Specimen had fallen into well.

ntori: Frog.

sirakògòma?: Turtle.

Non-Domesticated Mammals

bala: North African crested porcupine (Hystrix cristata). Hunted.

jakumawara: African wildcat (Felis sylvestris libyca).

juguni: Four-toed hedgehog (Erinaceus albiventris).

kungonyinè: Field mouse.

mankalan: Grimm's duiker (Sylvicapra grimmia). Hunted.

minan: Bushbuck (Trageldphus scriptus). Hunted.

ngèlènni: Squirrel (Atlantoxerus getulus?).

nkènè: Wildcat?

nyinè: Mice and rats.

sonsannin: Hare (Lepus aegyptius). Dry season garden pest.

tonso or *ntonso*: Bat.

toto: Giant Gambian rat (Cricetomys gambianus).

warabilen: Red monkey, Patas monkey (Erythrocebus patas). Dryland crops pest.

Reported to be in area, but no personal evidence during study:

bakòrònkuru or *bakòrònkule*: Big antelope.

gòn: Baboon (Papio cynocephalus).

jè or *lèfali*: Wart hog (Phacochoerus aethiopicus).

nkolonin: Oribi (Ourebia ourebi).

ŋènsembilenin: Mongoose.

saribakanjan or *seribaninkanjan*: Common genet (Genetta genetta).

worojani: Chimpanzee.

V. Birds.

Source for ornithological identification: Serle, Morel, and Hartwig 1977.

Birds Personally Identified in the Field (Soro):

alalacèbalenkuranin: Long-crested helmet shrike (Prionops plumata). Sighted at edge of wooded areas near fields (*fala*).

banikònò: Abdim's stork (Ciconia abdimii). Harbinger of wet season. Nests in village trees.

cèbilencèkònònin: Red bishop (Euplectes orix). Common around fields.

debininnyamatòn: Standard-wing nightjar (Macrodiptenyx longipennis). Likes rocky (*fuga*) and hill areas (*kulu*).

forokonin: Shikra (Accipiter badius). Call to fields. Lives in wooded areas during wet season.

ginginjè: Big owl. Sighted in hill area (*kulu*).

jèfurulènin: Senegal firefinch (Lagonosticta senegala), Senegal indigo finch (Vidua chalybeata), Lavender fire finch (Estrilda caerulecens), Red-cheeked cordon bleu (Estrilda bengala).

jicòròo: Senegal kingfisher (Halcyon senegalensis), Grey-headed kingfisher (Halcyon lencocephala) Habitat along streambed (*kò kònò*).

kamin: Grey-breasted helmet Guinea fowl (Numida meleagris). Hunted.

kònòninkujan: Pin-tailed whydah (Vidua macroura), Broad-tailed paradise whydah (Vidua orientalis).

makanbuguu: Abyssinian roller (Coracias abyssinica). Also called *karo*?.

moolo: Long-tailed glossy starling (Lamprotornis caudatus), Purple glossy starling (Lamprotornis purpureus).

naanagale: Mosque swallow (Hirundo senegalensis). Also *nanògòlenin* or *nanalen*, swallows and swifts.

ngunaninjè or *gunajè*: Cattle egret (Ardeola ibis). Follows cattle.

nkòn: Village weaver (Ploceus cucullatus). Very common in village and around fields. Dryland grain crops pest.

ntoolen: Grey hornbill (Tockus nasutus), Red hornbill (Tockus erythrorhynchus) Common around fields.

ntònkan: Denham's bustard (Neotis denhami). Hunted.

ntuban or *ntugan*: Black-billed wood dove (Turtur abyssinicus), Mourning dove (Streptopelia decipiens) Common around fields.

nyamatutu: Senegal coucal (Centropus senegalensis).

sakunu: Goliath heron (Ardea goliath). Sighted at pond (*bila*).

sèkè or *sègè*: General term for hawks and soaring predator birds, including Sagittarius serpentarius (not seen), Secretary bird and sparrowhawks (not seen).

solo: Senegal parrot (Poicephalus senegalus).

solokujan: Senegal long-tailed parakeet (Psittacula krameri).

sumunturu: Barn owl (Tyfo alba).

teentanin: Hammerkop (Scopus umbretta). Sighted at pond in road; fond of water where it can feed on frogs.

tèmètèmè: Black-headed plover (Vanellus tectus). Especially found in termitaria area (*nton*), but also wooded zones.

tèmètèmèdagara: Ruff (Philomachus pugnax). Habitat same as above.

tushyènin: Stone partridge (Ptilopachus petrosus). Sighted on Kulujanjan hill (*kulu*).

wòlò: Double-spurred francolin (Francolinus bicalcaratus). Common in grassy or wooded areas of lowland *fala*, especially around fields. Hunted.

yirikònkònkònònin: Cardinal woodpecker (Dendropicos fuscescens). Found in wooded areas.

Bamana Names Not Known:

Barbary shrike (Laniarius barbarus).

Black magpie (Ptilostonmus afer) Sighted around fields.

Crag chestnut-winged starling (Onychognathus morio).

Levaillant's cuckoo (Clamator levaillanti).

Orange-breasted bush shrike (Malaconotus sulfureopectus).

Paradise flycatcher (Terpsiphone viridis) Seen at the edge of wooded areas in lowland (*fala*), near fields, and along the streambed (*kò kònò*).

West African thrush (Turdus pelios).

Yellow-billed oxpecker (Buphagus africanus) Follows cattle.

Ornithological Name Not Known:

boroninkeleya

garagara

jokalanin or jòkala

karosadumèn or *karo*: Said to sing when approached in the bush, nesting in village, blue-black.

kokoba (seen): Very common in and around fields. Black and white. Round head. Long tail.

tiforokiya

togamba

Other Birds Known in Soro (but not seen personally):

badalakanmanlenyuman: Saddlebill stork (Ephippiorhynchus senegalensis).

bunuba or *buru*: Spur-winged goose (Plectropterus gambensis).

cèwòlònin: Common quail (Coturnix coturnix).

cikòn or *jikòn* or *digòn*: Ground hornbill (Bucorvus abyssinicus).

jèkònò: Bearded barbet (Lybius dubius).

kibaro or *kibaru*: Senegal wood-hoopoe (Phoeniculus purpureus).

kokoriko: Grey plantain-eater (Crinifer piscator).

perepere: Yellow-bellied fruit pigeon (Treron waalia).

Appendix C Fields

Bamana Field Types: *forow.*

bolobòforo: 'retirement field'. Personal field for farmers no longer working in the *forobaforo*, but wanting to work. Often negligible yield but social importance. Source: Wèlèsèbugu.

bolofèforo: 'side field'. Something worked on the side. A personal field, less important than the central *forobaforo*. Alternative name for individual or personal field (*jònforo*). Sources: Keleya, Soro.

boloseforo: (pronounced *buloseforo*) 'resource field' [*bolose* = *mon avoir* 'my holding, resource']. Individual or personal field. Work on the side of the principal thing, the *forobaforo*, to augment income (very similar to *bolofèforo*). Source: Wèlèsèbugu.

cèkòròbaforo: 'elder man's field'. Worked by man no longer working in the *forobaforo* of his household. Source: Soro.

denmisènforo: 'children's field'. Worked by unmarried young person. Source: Soro.

forobaforo: 'collective field; household or compound field'. Worked by all able bodied household members, except in some cases where: unmarried girls are not required to do fieldwork, where women or men 'retire' from the household workforce to farm solely their personal fields.

Linguists have not clarified the etymology of *forobaforo*. In the Bamana dictionaries--each of which is a bi-lingual dictionary rather than purely Bamana--of Dumestre (1981-7), Bird (1977), Taravélé (1913), and Bazin (1906), *forobaforo* does not have a separate entry. The French words used to describe *foroba* are: *public, communautaire, national, commun* derived from *grand champ* 'big field' (Dumestre 1985:589), *collectivité, public, communauté, universel* (Taravélé 1913: 168). *foro* means 'field' and *ba* refers either to it being important or big, hence 'big field'. From this root, the general meaning of 'communal holding' is inferred. Whether this has today become the understood meaning of *foroba* so that to designate the field itself, '*foro*' must be appended as a suffix, is not clear.

Bassett (1987, 1985) and Ernst (1976) use *foroba foro* for 'compound field', but others (Koné et al. 1983, Bagayogo 1982, Lewis 1979, Jones 1976) use exclusively *foroba* to designate the same field type. I will use *forobaforo* because it is the word used in the

two villages where we lived, and because it is a compound word construction, symmetrical with the other field types that place the word *foro* 'field' at the end of the word, e.g. *jònforo, musoforo.*[1]

foronincinin: 'little field'. Personal field. Source: Soro.

ganforo: 'okra field'. Women's field of okra. Small plot, often under 0.10 ha. Source: Soro.

jònforo: 'individual field'. Field farmed by younger brothers of the household head for their own families, independent of the household as a whole. Individual or personal field in general. Historically, slaves' field (*jòn* 'slave').

kungoforo: 'bush field'. Field spatially distant from the village.

maliforo: 'village collective field'. Field initiated by the Modibo Keïta government as a field unit producing at the village level. Other terms used: *gufòrònanan-foro* 'government field', *dugu forobaforo* 'village collective field'. Source: Soro.

musoforo: 'woman's field'. Field farmed by women. Sources: Wèlèsèbugu, Soro.

musokòròbaforo: 'elder woman's field'. Headed by a senior, or elder, woman who may benefit from the labour of her sons, and in some cases husband and daughters. In Soro during 1987, this field type was often headed by a woman whose eldest son had married and whose daughter-in-law worked in the household field (*forobaforo*). A personal field the head of which may no longer regularly sow and weed in the household field. Source: Soro.

nakò: 'garden'. Where sauce condiments (*nafènw*) are grown. Distinguished from a proper field (*foro*) in which dryland grain (*nyò*) is grown. For more discussion, see Ch. VIII.

soforo: 'house field'. Parcel close in distance to the house. Often receives organic waste and house sweepings (*sununkun, nyaman*) and manure.

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1. Lewis explored the link between the different meanings of *foroba* 'extended family field and communal goods' noting that one must '...connect their [Bamana people] inheritance system with the norms mediating rights and obligations in that other designation of the word *foroba*. The field is a paradigm of compound unity and of patrilineal inheritance in this Bamana community.' (Lewis 1979:43)

Appendix D.

Banana Crops.

sènèfèn ni sukuya 'crop and variety'

Unless otherwise noted, the source of botanical names is: Purseglove 1972, 1968.

bananku: manioc, cassava (Manihot esculenta) Euphorbiaceae.
Rainfed, in gardens, no open field cassava, small area. Tolerates depleted soil, drought-resistant, few pests. Promoted in Africa as crop that will survive migratory locust (Locusta migratoria) swarms. Spread north from coastal areas during the last century (Purseglove 1968). Eaten raw, peeled, or cooked.
Variety mentioned: *dawka* Known, but uncommon, not seen.

bara: calabash, bottle gourd (Lagenaria siceraria) Cucurbitaceae.
Variable shape and size of fruit. Shell used for ladles, and other utensils.

bene: sesame (Sesamum indicum) Pedaliaceae.
Rainfed, woman's field, small area. In 1897, sent by *faama* of Mademba of Sinsani states to Governor of Soudan Français noting small scale production and absence from trade (ANM IR-3). Young leaves used in sauces. Seeds borrowed from senior woman of Household II by junior father of Household XIV to use as medicine for his child's abdominal pains (*baarakorola*).

da: kenaf (Hibiscus cannabinus) Malvaceae.
Rainfed, gardens. Grown for fibre used in rope making.

da kumu: roselle (Hibiscus sabdariffa) Malvaceae.
Rainfed, very common in women's fields, also in household fields especially along the edge of a crop parcel. Frequently intercropped with groundnuts, either alternately in same row, or in alternate rows especially in furrow while groundnut on ridge. Fruit fermented and used to flavour sauces. Also called *da surunyami* 'short *da*'.

filen: calabash (Crescentia cujete?) Bigoniaceae.

fini: fonio, hungry rice (Digitaria exilis) Gramineae.
Fonio was not intercropped, nor fertilised. It occured on poor soils at the end of the cropping cycle. Fonio demands relatively minimal care due to its ecology. Once a site is selected for fonio, the bare, crusty soil surface is cleared of any weeds or millet stalks left from the previous year's crop. Usually little clearing is necessary since fonio is planted after other crops have already begun to deplete soil fer-

tility. Following clearing, seeds are broadcast by hand (*ka fini jènsèn*). Simultaneously, farmers disturb the soil surface with an initial light hand till (*ka shyèni kè*) enough so that the tiny seeds have a medium in which to root (germination 3-4 days) when the soil is moistened by the next rain. After the initial seeding, a single weeding, or two, is all that is necessary until harvest. If the fonio is dense enough and blocks weed growth, no weeding may be necessary. Ibn Battuta (1966:46) had couscous made from fonio in the 1350s.
Varieties: *ba* slow and late, 5-6 mos.
coka 5 mos.
le, *de* 4 mos., fast; *den* 3-4 mos., fast.

foronto: chili pepper (Capsicum annum) Solanaceae.
Commonly in gardens, both fenced and open. Women grew to use as condiment in sauces and to sell in local markets. Men grew to sell. Planted late in July or August, harvested in December-January.
Varieties: *ba* 'big'
gelemanin or *gelenin*
misèni 'small'

gajaba: sorghum (Durra cernuum) Gramineae.
Mentioned, but not much in Soro area (not seen at all); white; big seeds; more to the east. One of three principal sorghum races in Mali; mostly Sahel and northern Mali (Touré and Scheuring 1982).

gan: okra, lady's finger (Hibiscus esculentus) Malvaceae.
A classic garden crop, exclusively grown by women, mostly for domestic consumption as sauce condiment. Usually dried to store for use throughout the year. Also sold fresh and dried in local markets. Grown inside fenced gardens both during wet season and during dry season when it is irrigated (often intercropped with tomatoes). When outside fenced gardens, grown in small plots, usually on mounds.
Varieties: *jan* 'long', or *joona* 'early'
ntiiribaara Planted later, shorter and stout.

hariko: string bean (Phaseolus vulgaris) Leguminosae, Pap.
Relatively new crop in Soro. When grown, it is a cash crop, sold for the Bamako market and export. Sakobugu gardeners grew with written contract with Bamako trader in which fertiliser and seeds were supplied by the trader and their cost deducted from the earnings at harvest time.

jaba: onion (Allium cepa) Alliaceae.
Likes cool, moisture, loam (Purseglove 1972). Not a major crop, but grown in some Soro gardens.
Varieties: *bamanan* 'Bamana', *fitini* 'little'
tubabu 'European', *ba* 'big'

je: squash (Cucurbita pepo) Cucurbitaceae.

kaba, *maanyò*: maize, corn (Zea mays) Gramineae.
Prefers soils well-drained, aerated, deep, loamy, fertile, and rich in organic matter. Grown in open field, adjacent to houses, and inside fences.
Varieties: *bonijuba* 2 mos. and 9-10 days, fast, red (*bilenman*).
brigal 3 mos.
dagelenin 4 mos.
fulakaba 'FulBe maize', *kabajèni* 'little white maize' 70 days, white.
kabajan 'long maize', *kababa* 'big maize' 3 mos., late, long season so must be planted early.
nkobankala 3 mos. 20 days, *bilenman*, late.
nkurun 70 days.
sakara 3 mos. 10 days, *bilenman*, slow.

kinikè, *keninge*: sorghum, Guinea corn (Sorghum bicolor) Gramineae.
keninke: (Guineense gambicum) (Touré and Scheuring 1982)
binbiri: sorghum, *gros mil* (Sorghum gambicum) (Dumestre 1981)
Drooping head of seeds. Frequently intercropped with millet and cowpea, and sometimes with maize. Among its many pests are the parasite witchweed (Striga spp), birds, insects, and rusts. At the beginning of the century, this (*kinikè* or *dronko*) was the most widely distributed sorghum variety in the region as it is today (Touré and Scheuring 1982). The stalk reaches a max. height of 4 m, the seed is grey, and it grows on many soils. At the turn of the century, it was reported that *n'kenté* was a millet with a smaller and harder seed; it was not as favoured by the farmers and was less widely distributed; it was prepared like rice and used in the same ways; its varieties included *gouiaboo* (probably same as *gajaba* above), *gnonifié* (the earliest of millets), *diébanan* (ANM, ID-33).
Varieties: *ba* 'big' 4-5 mos., many seeds but fewer than *sakoroka*.
badonka Not at Soro, in Segu area.
kintè 3 mos.
sakoroka 4-5 mos., many seeds.
sègètuno (*sègè* 'depleted') for soils of low fertility, later in cropping cycle, 4-5 mos.
wiyanka 3 mos., most widespread at Soro in 1987.

kònkòn: cucumber (Cucumis sativus) Cucurbitaceae.
Common market garden crop, especially during the dry season. Manure and organic compost added; planted in circular cups to concentrate water on roots. Subject to downy mildew in damp air (Purseglove 1968).

kòori: cotton (Gossypium spp.) Malvaceae.
Not grown in Soro in 1987. One farmer told me of having grown it in the past in his personal field and could only comment that *'a man nyi'* 'it is bad'. In the past, it had been grown in the village collective field (*maliforo*). One or two farmers in neighbouring Munzun were said to be growing it.

malo: rice (Oryza glaberrima) Gramineae.
Has not been grown in Soro since before the drought. Farmers of age 22 can still remember it, and older women and men know the names of the varieties that had been planted in the streambed (*kò kònò*).
Varieties mentioned: *bintudala, dèsè, dosè, jèni, kamiyaka (Gambiaka)* [O. sativa], *kumbakurunin, loroso.*

melon: melon (Cucumis melo) Cucurbitaceae.
Grown solely in dry season, irrigated gardens, for market. Grows best in rich, organically manured loamy soils (Purseglove 1968). Farmers sell, depending on the size, at Pieni, Kasela, or Falajè.

nanaye: mint (Mentha spp.) Labiatae.
Clumps of less than 1 m^2 were found in five year-round cultivated, fenced gardens. In each case, it grew next to a well to benefit from spilled water. It is used in the preparation of tea.

nkentè: sorghum (Guineense margaritiferum) Gramineae.
kende in Touré and Scheuring 1982)
Many seeds, more than *keninge*. Mostly in western Mali (Ibid.).

nkòyò: aubergine, Bamana eggplant (Solanum spp.?) Solanaceae.
Garden crop. Grown for market and domestic consumption in sauces. Some transplanting and nursery flats. Harvest begins 3 mos. after planting.
Varieties: *ba* 'big'
jènin 'little, white'

nsèrè, nzèrè: watermelon (Citrullus lanatus) Cucurbitaceae.
Prefers well-drained soils, does not tolerate waterlogging (Purseglove 1968). Planted about at least a month into the wet season (Jul-Aug) in open fields. Primarily grown for market.

nyò: Grains including millets and sorghums.

sanyò: millet, bulrush millet, pearl millet, *petit mil* (Pennisetum typhoides) Gramineae.
Primarily intercropped with cowpea and sorghum. Rainfed, unfertilised. More resistant to pests such as Striga spp. and drought, as its northern geographical limit suggests (250 mm isohyet compared with 375 mm for

sorghum) than sorghum (Purseglove 1972).
Varieties: *baro* 4 mos.
folofolo very slow.
gènè tall, 4 mos.
sègètuno (see sorghum variety of same name)
suna 'precocious, early' Very early which makes it subject to bird damage; if only one farmer were to plant it, the crop was said to have little chance of being harvested because of birds; mentioned by Toulmin (1986) as common and by Lewis (1979) as used only by farmers with less reserve in granaries and subject to damage by birds.

shyò, sòsò: cowpea, black-eye pea (Vigna unguiculata) Leguminosae, Paplionoideae.
Dryland; grown in association with millet and/or sorghum. Creeps along ground, spreading to cover much of the soil surface beneath millet and sorghum. Prefers well-drained soil. Seed dried (11% water, 23.4% protein, 1.3% fat, 56.8% carbohydrate, 3.9% fibre) (Purseglove 1968). Mentioned by Ibn Battuta (1966:46) after his visit to Mali in the 1350s.
Varieties: *ba* 'big' 4 mos., white.
len 2-3 mos., fast, *bilenman*.

sira: tobacco (Nicotiana tabacum) Solanaceae.
Garden crop.

tamati: tomato (Lycopersicon esculentum) Solanaceae.
Grown exclusively in individual gardens. Wet and dry season. Irrigated except in some wet season fields with no well. Manured and often receives chemical fertiliser. Staked. Sometimes intercropped with okra. Dry season gardens always fenced for protection from livestock and rabbits. Grown from seed and transplanted. Certain farmers specialise in nursery gardening, selling seedling transplants.
Varieties included: *legom* large

tiga, tigè: groundnut, peanut (Arachis hypogaea) Leguminosae, Papilionoideae.
European oil extraction began in mid-nineteenth century, leading to development of main market for African groundnuts. Rainfed crop in open fields and fenced gardens. Common on both household and individual fields; especially common on women's fields. Dry weather required for ripening and harvesting; prefers sandy loams with calcium and organic matter, but can tolerate heavier soils (Purseglove 1968). Before planting, seed selected at house for size and viability. Planted after main grain crops have been started. Harvest starts about 4 mos. after planting. Nutritional content: 5.4% water, 30.4% protein, 47.7% fat, 11.7% carbohydrate, 2.5% fibre (Ibid.). Leaves eaten

in sauces.
Varieties: *ba* 'big'
misèni 'little'

tiganinkurun: Bambara groundnut (Voandzeia subterranea) Leguminosae, Papilionoideae.
Drought tolerant once past the early stages of plant development, pest and disease resistant. Most abundant in the Segu and Kulukòrò Regions. Best in sand and sandy-black clay soils. Tolerates worn-out soil and hot-dry areas. Matures in 100-180 days. Soaked and boiled, often eaten as paste. Nutritional content: 16-21% protein, 4.5-6.5% fat, 50-60% carbohydrate. Two varieties found in five study villages near Cinzana: *jèni*--preferred because early, good taste, and resistant to pests and disease; *jèba*--more productive in heavy rainfall years (Soumaoro (1983). Ibn Battuta (1966:45) reported it fried in shea butter.
Varieties: *bilenman* 'red'
finman 'black'
jèman 'white'

woso: sweet potato (Ipomea batatas) Convolvulaceae.
Grown in 1 m broad hand made ridges in moist, well drained soil. Ridged with *pedu* 'wide hoe' larger than a *dabamuso*. Little care required after established. Leaves used in sauces.
Varieties: *bilenman* 'red', *gumawele*
jèman 'white'
siniwa 'Chinese'

Trees.

buyaki: guava (Psidium guajava) Myrtaceae.
Grown in gardens, not irrigated, not closely tended. Fruit matures 5 mos. after flowering.

jafarna: Unidentified shrub found in fenced gardens. A powder from its seeds said to have been of interest to Europeans in the past. Soro residents described the powder as an irritant, causing coughing.

lenburu kumunin: lemon (Citrus limon) Rutaceae.
Grown in gardens, not irrigated, not closely tended.

mangoro: mango (Mangifera indica) Anacardiaceae.
Prefers climate with pronounced wet and dry seasons; many soils (Purseglove 1968). Common in fenced gardens, sites of abandoned gardens, and around houses. Slips (*kuw*) planted in 1987 (See Ch. VIII).
Varieties: *amèrikèn* 'American' Large, hence the varietal name.
donsennaka from village near Keleya (S of Wèlèsèbugu) where first developed; not

found in Soro.
fumani
grèfè 'grafted'
koli fibreless, large, round, smooth green skinned, small pit, ripens late (early May).
micka blue-green skin?
nunjanni 'long nose' So called because of shape of tip. First to ripen, at the end of March/first week of April. Very common.
nunkuruni 'round nose' Same as above except longer shape.

manji, manje: papaya (Carica papaya) Caricaceae.
Grown in fenced gardens. Best in well-drained soil, will not tolerate water-logging and subject to rot at base caused by Pythium spp. (Purseglove 1968). Fruit eaten or sold in local markets.

namasa: banana (Musa spp.) Musaceae.
Occasionally grown in moist parts of gardens near the streambed. More common in the gardens along the Faya to the south.

rezen: grape (Vitis vinifera) Vitaceae.
Introduced in 1982 by head of Household XV. II,1 planted his two vines in 1984. Grown on the trestles (*gaw*) over the front of eight houses in Soro. Planted in clay planters about one metre to just under a metre high, with a diametre of one to just over a metre. Fertilised with donkey manure (*fali bò*), they were watered one to two (during hot days prior to ripening) times a day during the dry season by children carrying buckets of water from the compound well. The watering stopped (21 April 1987) about one month before harvest date (17 May 1987) to sweeten the grapes. Immediately after harvest the vine was trimmed back and watering recommenced. A second harvest, about half the volume of the first was obtained in late August. One farmer sold to the airport where the grapes were exported. Others sold to the local Bamako market, or are waiting until their vines mature. Mentioned as early as 1891 in Mali (ANM IR-3).

somo: cashew (Anacardium occidentale) Anacardiaceae.
Grown in gardens, not irrigated, not closely tended. No use of the nut as far as I could tell. The 'apple' (enlarged pedicel, receptacle, and disc) was eaten.

Appendix E.

Sample Dry Season Garden Surveys.

1) Date of Survey: 12 April 1987
Location: 200 m south of central Soro village houses, on left (east) bank of *kò*, sloping down to edge of streambed.
Area enclosed in fence: 87 m²
nakòtigi: Younger brother of head of Household IV, age 45-50, 3 wives.
Working at time of survey (8.30-11 a.m.): 18 year old son of *nakòtigi*, watering tomatoes; 20 year old hired worker from neighbouring village digging well.
Intercropping: None observed.
Fertilising: 1 sack N-P-K on tomato, > 1 sack N-P-K on chili pepper; manure; *nyaman*.
Soil type: *dugufin*
Wells: 2

Crops and plants identified within fence:

tamati 'tomato': 24 beds of 12 plants (approx. 288 plants) in green fruit and flowering stage; 25 beds (approx. 300 plants) 10-16 cm tall, pre-flowering, manure spread over soil surface the day before; 4x4 m seedling table (*tamati ga*) of 2-3 cm seedlings; 10 beds just prepared yesterday with cart load of *nyaman* and manure, unplanted. Beds were from 2-20 m from nearest well.

gan joona 'okra': 5 plants, planted in individual circular cups to retain water; eaten by rabbits; 10 m from well.

kònkòn 'cucumber': Approx. 10 plants, planted in in dividual circular cups; eaten by rabbits; 10 m from well.

bananku 'cassava': 15 m² plot, 2.5-3 m high, not watered, to be harvested during *samiya*.

foronto 'chili': >80 individual circular cups, harvested, dried pepper stalks being cleared, collected in pile to burn; 10-20 m from well.

nkòyò 'Bamana aubergine': A few in seedling bed for transplanting at the start of the wet season.

nanaye 'mint': Little cluster, 3 m from well in moist soil.

lenburu kumunin 'lemon': 5 trees, not watered or pruned.

manjè 'papaya': 1 tree, several others recently died from rot at the base of the trunk.

buyaki 'guava': 10-12 trees, not watered or pruned.

jafarna: 10 shrubs.

mangoro 'mango': 60-80 grafted trees; fruit sold at Pieni and Kasela.

sunsun (Diospyros mespiliformis): 7 trees.

nsira 'baobab': 6 trees (<4 m).

sebe (Borassus aethiopium): 1 tree.

tosunsun (Annona squamosa): 1 tree.

bagannin (Jatropha curcas): Living fence, cut back during the wet season like a hedge.

Others: *jabi* 'henna' 1 plant, *namasa* 'banana' 1 tree, *nèrè* (Parkia biglobosa) <1 m tall, *jala* (Khaya senegalensis) <1 m tall, *sinjan* (Cassia sieberiana), *goro* (Acacia polycantha campylacantha), *ninko*?, *fufu*.

2) Date of survey: 20 April 1987

Location: 200 m south southwest of central Soro houses, right (west) bank of *kò* sloping into streambed.

Area enclosed by fence: 45 m^2

nakòtigi: 28 year old son of head of Household I, married, no children.

Working at time of survey (8-10.30 a.m.): Younger brother of *nakòtigi* watering tomatoes, elder half brother watering.

Intercropping: Tomato and okra.

Fertiliser: 2 *nyaman* sacks at gate.
Wells: 4
Soil: *dugufin*

Crops and plants identified within fence:

tomato: >50 beds of 8 plants flowering and green fruit; 27 beds of 10 cm plants (total approx. 616 plants); next to well.
cucumber: 8 vines in individual circles, next to well.
okra: 8 mature plants, flowering, rabbit damage; seedlings with tomatoes.
tobacco: 30 beds, 6 plants per bed, dry now, harvested; next to well.
mango: 1 tree.
guava: 1 shrub.
papaya: 14 trees.
Others: *nyama* (Piliostigma), *balansan* (Acacia albida)
Suckers coming up, *nsaŋuni jèman?*

3) Date of survey: 22 April 1987
Location: 250 m south of central Soro houses on right (east) bank of *kò*, sloping down to streambed.
Area enclosed: 67 m²
nakòtigi: Younger brother of head of Household XIV, age 38-40 years, 2 wives.
Working at time of survey (9-11 a.m.): *nakòtigi* tending seedlings; 16 year old son-in-law watering tomatoes; two 6-7 year olds playing, building bird-watching look out platform.
Intercropping: Melon and tomato; okra and tomato; maize and tomato; chili pepper and papaya.
Wells: 1
Soil: *dugufin*

Crops and plants identified within fence:

tomato: 49 beds, mature plants staked 1 m high, green fruit and flowers; 3 beds for transplanting at dif ferent stages from seedling sprouts to 5 cm. to 8-10 cm.; 0-10 m from well.

maize: A few stalks with tomatoes.

okra: 30 intercropped with tomatoes, mostly damaged by goats.

cucumber: 85 circles left from the wet season of 1986; 5-10 m. from well.

cassava: 1 plant, 3 m high, to be cut and planted later.

chili pepper: Dry now, harvested, under papaya.

melon: >10 plants intercropped with tomatoes; flowering; next to well.

Bamana aubergine: Seedlings.

mint: patch, 3 m from well.

orange: 2 trees.

papaya: 29 trees, 4-10 m high, watered, tree base cupped and straw-covered to retain water, fruits up to 30 cm in length.

guava: 8 trees.

cashew: 13 trees.

jafarna: 6 trees.

mango: 12 trees.

sunsun: 5 trees.

sebe: 1 tree.

baobab: 2 trees.

taki?: 1 tree, 10-12 m.

nsòyen (Leptadenia hastata): Vine in fence.

bagannin: Living fence.

Appendix F

Coding of Farm Production Units.

Household farms

Roman numerals are used in the text to indicate specific household farms. A 'household farm' is headed by a *dutigi*, grows crops in a field (*forobaforo*), owns seeds and tools (hoes, ploughs, etc.), stocks grains and pulses in a granary, and consists of the joint household farming endeavours undertaken by the household farm labour group. I define household farm labour group as the largest group of household residents working together on a single field under the authority of a *dutigi*. The coding system corresponds with the place in the order of arrival in which the lineage is remembered to have first arrived in Soro.

Order of lineage arrival in Soro	Total no. members	Max. no. fieldworkers*	Area (ha) cultivated
I	38	14	13.5
II	27	10	8.2
III	8	4	3.3
IV	44	20	8.8
V	7	4	2.2
VI	12	6	2.7
VII	35	12	7.0
VIII	6	3	4.3
IX	65	34	19.6
X	13	8	6.5
XI	10	5	3.1
XII	15	6	4.6
XIII	10	6	2.8
XIV	44	22	3.6
XV	25	11	12.9
XVI	4	4	2.2
XVII	8	3	2.0
XVIII	8	5	1.0
XIX	11	5	2.2
XX	24	8	9.2
XXI	7	2	1.6
XXII	4	4	1.1

*Includes all persons from the labour group who worked in the field at least one time during the 1987 season. The labour input per crop or per unit area is very different (see Ch. VII).

Women's Farms

The Roman numeral corresponds to the household of which the woman farm head is a member. A woman's farm is headed by a woman, grows crops in a field (*musoforo*, *musokòròba-foro*, etc.), may own seeds and tools, stocks produce in a granary, and consists of the farming activities she and those who work for her--especially her sons and grandsons--undertake. The Arabic numeral relates to her relative age among that household's women farm heads, e.g. VI,1 would be the eldest woman farm head in Household VI. In this table, I have not included small, non-commercial garden plots farmed by women.

Farm head by household and seniority	Relation to head of household	Max. no. workers*	Area (ha) cultivated
I,1	wife	1	1.0
I,2	wife	3	0.7
I,3	wife	4	0.5
I,4	daughter-in-law (d-i-l)	2	0.2
II,1	wife	3	2.2
II,2	wife	2	1.7
IV,1	sister-in-law (s-i-l) (widow)	2	1.4
IV,2	s-i-l (widow)	3	1.4
IV,3	wife	2	1.0
IV,4	wife	5	0.8
IV,5	s-i-l	1	1.1
IV,6	s-i-l	1	0.2
V,1	wife	1	0.2
VI,1	mother (widow)	1	0.8
VII,1	wife	2	0.1
IX,1	wife	4	0.4
IX,2	wife	5	1.1
IX,3	wife	3	1.4
X,1	wife	1	0.8
X,2	wife	2	0.2
XII,1	mother (widow)	1	0.2
XIII,1	wife	1	0.2
XIV,1	wife	3	1.6
XIV,2	wife	1	0.1
XIV,3	d-i-l	1	0.1
XV,1	wife	2	0.5
XV,2	s-i-l	1	0.4
XVIII,1	mother (widow)	2	0.2
XIX,1	wife	1	0.3
XXI,1	wife	2	0.1

*Includes all persons from the labour group who worked in the field at least one time during the 1987 season. The labour input per crop or per unit area is very different (see Ch. VII).

Men's Personal Farms

The Roman numeral corresponds to the household of which the man farm head is a member. A man's personal farm is any sub-household farming unit headed by a man (not a household farm), grows crops in a field (*jònforo*, *bolofèforo*, etc.), may own seeds and tools, stocks produce in a granary, and consists of the farming activities he and those working for him (especially his wives, younger brothers, and children) undertake. The capital letter relates to the farmer's seniority by age and relation to the head of household, e.g. II,B is the second son of the head of Household II, and IV,B is the next youngest brother of the head of Household IV. Where the head of the household himself has a personal field, I have designated him as 'A'. I have included market gardens here, since they are an integral part of the overall 'farm'.

Farm head by household and seniority	Relation to head of household	Max. no. workers*	Area (ha) cultivated[1]
I,A	son	1	garden
I,B	son	3	0.1
I,C	son	2	garden
I,D	son	1	garden
I,E	son	1	garden
I,F	cattle herder	2	0.3
II,A	son	6	0.7
II,B	son	1	0.3
II,C	son	1	garden
III,A	self	1	garden
IV,A	self (retired)	1	0.8
IV,B	brother (retired)	1	1.6
IV,C	brother	5	0.8
IV,D	brother	1	0.7
IV,E	son	5	0.4
IV,F	nephew	1	garden
IV,G	son	1	garden
IV,H	nephew	1	garden
IV,I	nephew	3	0.4
V,A	son	2	garden
VI,A	self	2	garden
VII,A	self	2	0.3

1. The area listed here is for dryland grain and pulse crops as well as garden crops (fruits and vegetables). If the farmer had only a garden, and it was under 0.25 ha, I have not included the area, simply indicating 'garden'.

VII,B	brother	3	0.5
VII,C	brother	2	0.4
VII,D	nephew	2	0.2
VII,E	nephew	1	0.3
VIII,A	self	2	garden
IX,A	son	5	1.3
IX,B	son	1	1.2
IX,C	son	7	1.5
IX,D	nephew	5	2.0
IX,E	son	5	2.2
IX,F	son	1	0.9
IX,G	son	1	garden
IX,H	son	2	0.4
IX,I	son	1	garden
IX,J	son	1	garden
X,A	son	1	garden
XI,A	self	1	garden
XI,B	son	1	garden
XII,A	self	1	garden
XIII,A	son	1	garden
XIII,B	son	1	garden
XIV,A	self	13	8.4
XIV,B	brother	6	3.0
XIV,C	brother	5	1.2
XIV,D	brother	3	2.3
XIV,E	brother	2	1.1
XIV,F	son	1	garden
XIV,G	worker of XIV,B	1	garden
XV,A	self	7	garden
XV,B	brother	1	garden
XIX,A	son	1	garden
XXI,A	self	1	garden

*Includes all persons from the labour group who worked in the field at least one time during the 1987 season. The labour <u>input</u> per crop or per unit area is very different (see Ch. VII).

Appendix G.

Labour Market/Migration.

Soro farmers are primarily subsistence crop producers, but as Ch. VI and VIII show, in order to earn cash they also produce commodities. Another way to earn cash is to enter the labour market in a cash-earning job. This table shows that such jobs have been initiated in Soro and sought in Bamako, the cotton-growing districts of Mali, and in neighbouring countries. Farmers have travelled to earn cash, go to school, to visit relatives, see the world, and then to return to Soro to farm. Others have gone away and not returned. Some of those who have not returned have cash-earning jobs and are able to regularly or occasionally support households in Soro.

In the interviews, I asked farmers about their experiences with labour migration. None of the women interviewed reported any travel for cash-earning work. Except for the mother of two emigrated sons (I,3), the list, thus, includes male migrants and the kind of work that they did. The list is not intended to be a complete documentation of all emigration from Soro, or of all sources of off-farm income. It does, however, give a picture of the kind of relationship Soro residents have had with the cash-earning sector, and indicates what might be important sources of income for some of the weaker households.

Farmer[1]	Relations with labour market: relatives, off-farm cash-earning activity, migration
I	Forced labour during the colonial era, Kasela road.
I,A	Carpenter during dry season, in Soro.
I,C	Tailor during dry season, has sewing machine in Soro, learned to sew in Baginda during two dry seasons (2 mos.).
I,3	One son lives in Bamako, another in Segu.
II	Military service in Dakar during the colonial era.

1. I have designated farmers by the farming units of which they are the head (See App. F).

II,A	Local moped mechanic in Soro and Munzun; drove a truck in Côte d'Ivoire, Ghana, Niger, Nigeria, and Togo for 5 years.
II,B	Sold goods on the streets of Bamako for one month (*tabalitigi*), picked fruit in Sikaso for one month, visited to Mòti, Kuciala.
II,C	Sells bottled drinks in Soro which he buys in Bamako.
III	Older brothers live in Bamako.
IV,B	Made clothes in Kasela for five years, grew groundnuts in Senegal for two years during the colonial era (c.e.).
IV,C	Grew groundnuts in Senegal for one year (c.e.).
IV,D	Grew groundnuts in Senegal for five years (c.e.).
IV,E	Worked in Ivoirian coffee and cocoa fields for one year, and worked for two and a half years in Abidjan.
V	Veteran of the Second World War, served in Morocco and France; son lives in Bamako and works as a cook for an embassy.
V,A	Worked for four years in Bamako's industrial zone, returning to work in the household field during each wet season.
VII,B	Grew groundnuts in Senegal for four years (c.e.), worked in Bamako as a painter for four years.
VII,C	Grew groundnuts in Senegal for two years (c.e.).
VII,D	Construction worker in Bamako for one year.
VII,E	Tied cotton and loaded trucks for five years in Kuciala, Sikaso, and Fana.
IX,C	Sells blended petrol for mopeds and operates a small store at his house.
XI,B	Sells sugar, drinks, matches, and other goods at his house.
XII	Sold goods on the streets of Bamako (*tabalitigi*) for two years. Sister was trying to go to Saudi Arabia where her husband works.
XIII	Village imam, one son in Abidjan trading, another son driving truck based in Abidjan, travel to Senegal(?).
XIV	Qur'anic teacher, son works as auto parts merchant in Bamako where head of XIV,A lives during dry season; went on pilgrimage to Mecca in 1986.
XIV,B	Regional kola nut trader.
XIV,D	Operates store in Soro, buying goods in Baginda; sells matches, cigarettes, kerosene, candy, flour, batteries, sugar, and other goods.
XIV,F	All-season carpenter in Soro.
XV	Qur'anic teacher, went on pilgrimage to Mecca in 1979.
XVI	Veteran of war in Indo-China, military service in Europe.
XVII	Local trader of grain and other goods in Munzun, Kasela, and Sunuguba markets.
XVIII	Repairs radios from neighbouring villages in Soro; older brother in Bamako.

XIX	One son working as trader in Lagos, another working in Gabon.
XX	Owns second house in Baginda; forced labour during the colonial era.

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Note: Where I have referred to documents consulted at the Malian National Archives in Bamako, I have used the abbreviation ANM followed by the code under which they are filed. The names of the files cited in this study are listed above.

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